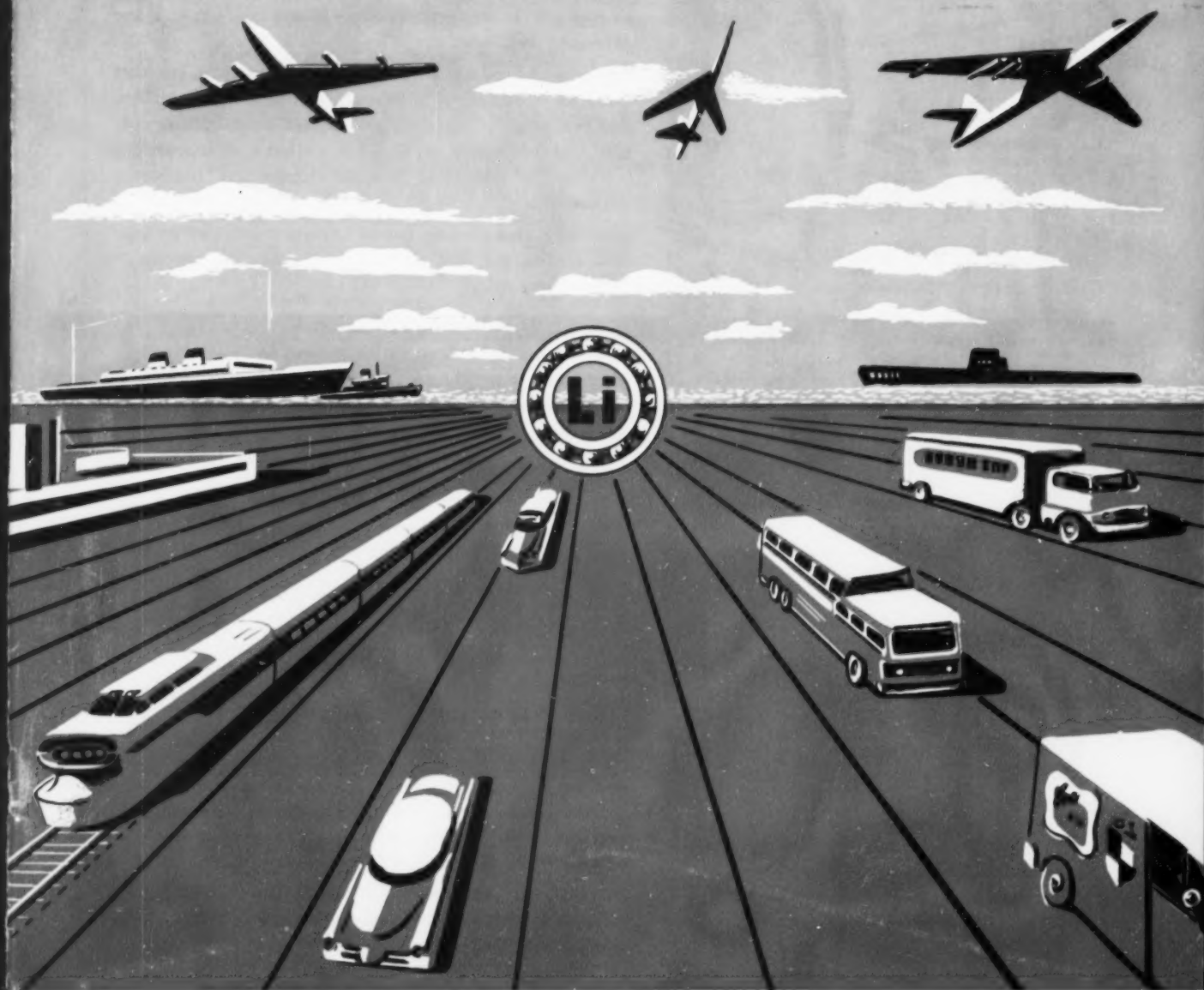


NOVEMBER • 1956

NLGI

Spokesman

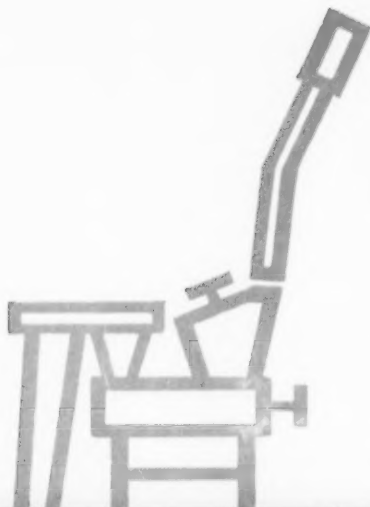
Journal of National Lubricating Grease Institute



A New Grease Mixer ... Page 14



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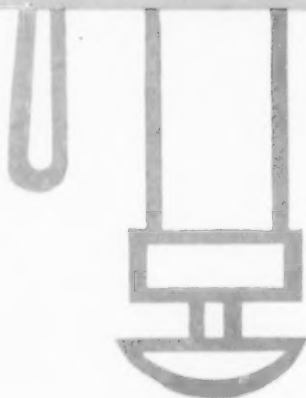
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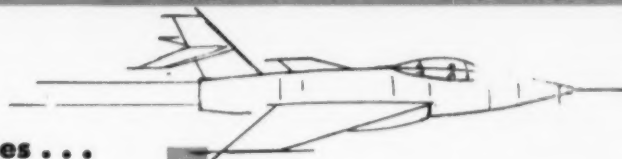
for Lithium Base Greases . . .

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for Aluminum Base Greases . . .

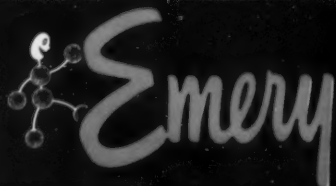
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President's page

by J. W. LANE, President, NLGI

TARGET FOR 1957

In every organized group, the routines of normal activity may at times seem to have little to do with furthering that group's objectives, or the basic reasons for its existence. The NLGI is no exception, and for this reason your new President would like to call attention to one or two points which we believe should be kept clearly in view during the coming year.

In our opinion, the more technical of our activities is proceeding satisfactorily, and should continue to do just that. We propose, therefore, that we become increasingly Marketing conscious. The term "Marketing" embraces several phases:

1. Increasing lubricating grease user satisfaction, by informing him to a greater and more accurate degree of the advantages, limitations and correct application procedures of lubricating greases. Much has already been done, but more remains to be done, especially in getting over the message that modern greases are ex-

ceptional lubricants that can do an exceptional job in their field.

2. Retention of lubricating grease as the accepted product in those areas where it is presently successful, that is, fighting in every honorable way the attrition of markets that follows replacement of greases by substitutes or other measures adopted by designers or users. Increased attention to publicizing proved or demonstrable benefits to user and designer might be most helpful in this respect.

3. Extension of markets, by finding new uses for lubricating grease. It might be objected that every grease marketer is always pursuing the points listed. While this is true, a concerted effort by a group such as NLGI would undoubtedly be more effective in the long run.

Closer Contact Within Industry

As a corollary to the latter statement, one of the quickest ways to get results should be with other groups concerned with lubricating grease and its use. This suggests the matter of closer contacts, greater cooperation, with such organizations. Again, this is nothing new—it already exists. However, it should be strengthened, broadened, and made more virile. The SAE, API and ASLE, for example are three important groups with certain interests directly paralleling those of NLGI. In our opinion, free interchange of constructive ideas and criticism between organized groups directly concerned with the subject can be extremely effective, as well as time-saving.

We are candid enough to admit that we can suggest no quick and easy magic formula that will bring all the foregoing about. And we are optimistic enough to hope that constructive ideas may be forthcoming from the members of NLGI. Let us hear from you, no matter how small your contribution may appear at first sight.



**NLGI's President-Elect
Outlines a Progressive
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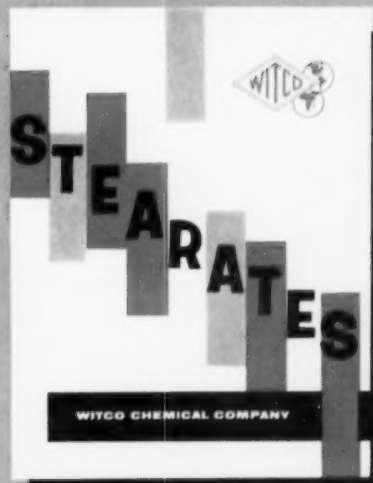
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NLGI

Spokesman

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NOVEMBER, 1956

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ABOUT THE COVER

FOOTE MINERAL COMPANY continues its tradition over the years by sponsoring a SPOKESMAN cover. This year's scene portrays an industrial plant and various modes of transportation which are dependent upon the proper lubrication of their bearings. The chemical symbol for lithium represents the hub of lubrication for the many machines portrayed. (Design and engraving courtesy of Foote Mineral Company).

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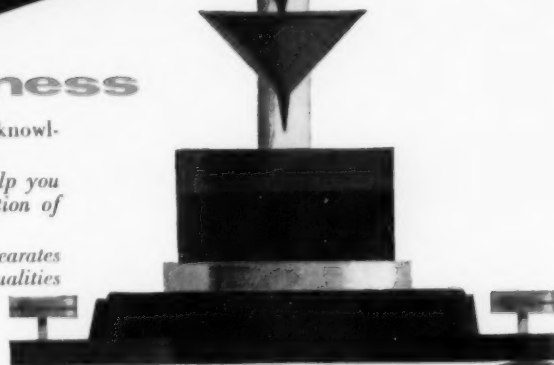
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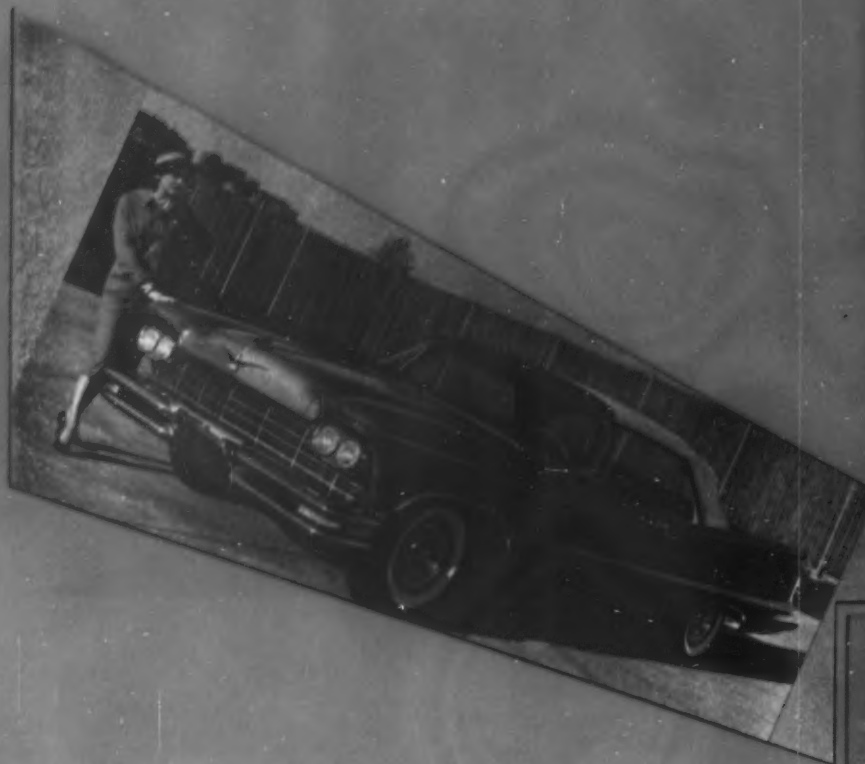
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NLGI's Keynote Speech at 24th Annual Meeting

HIGHWAY SAFETY is everybody's business. To be sure it is the business of us who design, manufacture, and sell automobiles. And it is the business of those of us who provide goods and services essential to the operation of motor vehicles.

Your own Institute reflects its interest in the subject of highway safety by making it a subject of this meeting. And I think you should be complimented for the public-spirited interest that represents. Of course, there is nothing academic about your interest. The products your institute members manufacture and distribute figure importantly in vehicle safety.

Certainly, proper lubrication of a machine is as primary to its safety as to its very operation. High on any list of *preventive* safety measures for an automobile or truck is top-quality maintenance. And such maintenance must certainly include proper, adequate, and periodic lubrication with the proper lubricants for each specific job.

As your industry and mine share a responsibility for highway safety, so also does every single person who drives, rides, or walks anywhere in this country. I know this is the last audience in the world I would have to remind that the automobile, both directly and indirectly, is a vital part of the everyday life of every man, woman and child in the United States. The kind of civilization we have in America, the standards of living we enjoy, could not exist without the safe and rapid movement of people and goods over our streets and highways.

Actually, since the beginnings of the automobile, we've been doing a steadily improving job on highway safety. Up to this year there has been a steady decline in the fatality rate per 100 million vehicle miles. As a matter of fact, that rate today is lower than it was when the horse was the chief motive power for our transportation.

Continued, next page

Safety on the Highways Is Everybody's Job

BY JAMES C. ZEDER
Chrysler Corporation



"Our highway fatality rates are . . . too high. We've got to bring them down."

But this improvement has been completely submerged by the millions of miles we Americans travel each year in our cars. Whatever our highway fatality rates are in total numbers they are too high. We've got to bring them down—not by panaceas, not by wild flights of fancy, and not by singling out scapegoats. The job can only be accomplished by a studied and systematic attack on the causes of highway accidents. It's going to take scientific research—and lots of it. It's going to take patient plodding—and lots of it. It's going to take united, cooperative action—and lots of it.

We can point with a sense of accomplishment to all of the advances we have made in the various aspects of traffic safety, but it would be a tragic mistake to believe that what we have accomplished to date is all that is to be done or all that can be done. Complacency can be our most dangerous enemy.

Earlier this year, I know all of us who are interested in motor transport and traffic safety were heartened by the passage, at long last, of the Federal highway bill. Here at last was the beginning of concrete action on a broad and imaginative scale to take us out of our highway muddle and put our road system in tune with the times. With this new national system we can put into effect the best of all we have learned about how to make the safest possible roads.

The road building program, however, is not without complications. I would like to call attention to a serious stumbling block. It is a stumbling block which demonstrates clearly how vital united and unselfish effort is to national highway safety.

It is generally agreed that limited-access highways provide the best means for carrying heavy traffic. For this

reason a major portion of the new Federal highway bill is devoted to construction of this type of highway.

Everybody agrees on this point, it seems, until the time comes to establish routes for these modern new highways. Then the hue and cry is terrific at the local level from persons living near a proposed route. It seems that modern highways are fine as long as you build them through the other fellow's back yard.

The highway program will be subjected to delay and lengthy litigation unless the people accept the principle that these highways are designed to benefit the great majority of the motoring public.

Even when we overcome such obstructions as this, the highway's part of the traffic safety problem will not have been automatically solved. First of all, this new super-modern highway system still largely exists on paper only. It will be years in the building. It is still in the future, and the traffic safety problem is with us every minute right now.

And even when this system is completed, it still will represent only a fraction of the roads over which our cars will travel their millions of miles each year. We shall still have the thousands upon thousands of miles of state roads, secondary roads, and city streets, and they will still have their built-in accident traps—blind spots, improperly graded curves, twists, turns, and grades that were never intended for the vehicles and the traffic conditions of today and tomorrow.

Now that we are about to get a national system of major highways worthy of today's America, we cannot sit back content that the highway job is all done. We've got to continue to work for and support better safer highways and streets in our states, counties, cities and towns. And we must be alert that, in their building, we take advantage of what we already know about making roads for safety.

Talking about taking advantage of what we already know in the area of highway safety brings up what I consider a most significant factor. At a White House safety conference the observation was made that we could cut traffic accidents in half if we could apply what is already known to be needed in the states and communities of the nation.

I believe it is generally agreed that we have developed enough of the technical data and methods in the fields of accident records, education, enforcement, laws and ordinances, administration, and public information that if we universally applied this knowledge, there is no doubt but that we could turn in a far better record than we have to date.

We know what causes many accidents and simply are not doing anything about it. We know, for example, that the unreasonably slow driver—the driver who pokes along at ten or twenty miles below the normal speed of traffic—is as great a hazard as the speeder or reckless driver. But how many times have you heard of a driver being ticketed for going too slowly?

That, of course, is an isolated example. On a broader front, traffic experts unanimously recommend better roads, high school driver education, vehicle inspection, uniform traffic laws, strict—but realistic law enforcement, better traffic control, better driver licensing, and so on. Many areas of the country fall short of what the experts consider necessary in all of these phases of accident prevention. Most localities are good in some respects, but wholly inadequate in others.

The reason, of course, is that it is such a gigantic job—involving some 70 million drivers, three million miles of road, and at least 3,600 governmental jurisdictions. Progress in this field requires governmental implementation—the passage of laws, appropriation of more public funds for expanded safety activities, additions to school curriculum, stricter laws and other governmental regulations.

To illustrate the problem we are up against, let's take a look at the highway situation. As far as highway and road building is concerned, we are now playing the game with an astounding total of 38 different sets of rules—38 different codes or standards used by the nation's highway departments.

Naturally, each highway department thinks it knows the best way to build highways. Certainly, however, there cannot be 38 different best ways. I am not a highway expert, but it seems to me that we could eliminate a lot of confusion for drivers by agreeing on a basic way to build highways and overpasses. We should eliminate this confusing hodge-podge and work on a united front.

To be sure, progress is being made daily in the task of pulling the nation together in the fight against highway fatalities. To accelerate this progress, it is the job of everyone with a voice in government—which means all of us—to urge adoption of known remedies with the goal of getting tried and tested methods adopted everywhere.

That would certainly be a giant step in the right direction. At the same time we know that even an across-the-board, coast-to-coast, state-by-state adoption of all proven safety precautions and methods would still leave us with a heavier traffic toll than should be tolerated.

There are facets of this problem of which the surface has not even been scratched. There is very little known concerning the human factor as it relates to accidents. The mental, emotional and physical behavior of man is so important a cause of accidents that study and research are vitally important.

After all, the best apparatus for accident prevention is located above the ears of each and every driver.

An automobile driver is really three beings—a physical being, a mental being, and an emotional being.

We strive to accommodate the physical and mental beings in the design of our cars. We haven't figured out a way yet to compensate for the driving habits of a man who just had an argument with his wife while the

breakfast coffee got cold, and is twenty minutes late for his first meeting with the big boss.

There has been tremendous progress in developing an automobile suited by efficiency, comfort and safety to the physical and mental human being. Over the years we have seen our industry and allied industries invest hundreds of millions of dollars in the development of all-steel bodies, better brakes, finer driving lighting, improved driver vision, steering powered for safety, safety glass, more durable tires, increased horsepower for greater vehicle agility, and many, many more features that spell safer and safer automobiles.

Our philosophy at Chrysler Corporation has been to design automobiles as a logical extension of the driver himself. By that I mean we have sought to design cars that can be controlled almost as easily and effectively as a person controls himself while walking.

It was by this means that we sought to prevent accidents from happening. We realize that no matter how great the progress in this area, accidents will still happen. And so today heavy emphasis is being placed on designing cars to minimize injury to occupants when an accident does occur.

To this end, we developed safety door latches to prevent possible door opening under impact, seat belts to restrain car occupants, recessed steering wheels to lessen the probability of driver injury, protective padding of the vehicle interior and many other features.

But this brings us back to the emotional man. The safety belt is a good example. A recent survey showed that nearly nineteen per cent of the car buyers who bought and paid for seat belts never used them. Another 25 per cent only used them some of the time. There is certainly no safety in a safety belt lying limply on a car seat.

"We could eliminate confusion for drivers by agreeing on a basic way to build highways and overpasses . . . we now have 38 different standards."



The automobile industry should, can, and does work at persuading the public to buy and use these safety features and there is no doubt that we will continue to do so in the future. Similarly, we will continue to employ all of the skill we possess in designing additional safety features that will be practical and saleable.

You notice that I speak of safety features being both practical and saleable—that is saleable not from the standpoint of profit but from the standpoint of acceptability. These are considerations that are sometimes overlooked by observers who may be well meaning but plainly do not have the specialized knowledge required for the successful designing and marketing of automobiles.

You may have heard people suggest that we should put governors on our cars to limit their speed. The best approach, of course, is governors on drivers. But, in so far as cars are concerned, that may sound like a good idea until you examine the facts in the matter as we did—and, I might add, that we did this long before governors became a subject of public interest.

There are several types of governors for engines. The use of some types would be sheer suicide, but let's consider the very best kind—one that permits full use of the car's power for accelerating from a stop and in the lower speed ranges, but cuts it off at a predetermined speed.

To gain an appreciation of what this means, imagine the sinking sensation you would get if you were passing a truck on the highway and just as you got abreast of the truck your car suddenly lost its power—almost as if you had run out of gas. It's a frightening thing, believe me. I have driven cars with experimental governors on them.

Stating it simply, a governor deprives the driver of power and control over his vehicle—often at the time he needs it most. The automobile manufacturers intend the power of modern cars to be used wisely and responsibly. Having reserve acceleration available to avoid a potentially dangerous situation is an important safety factor. We conducted demonstrations of this at the Chrysler Proving Grounds when the House Subcommittee on Traffic Safety paid us a visit last August.

We created a common highway situation—one car passing another. It was an easy and safe maneuver for one of today's cars. We then created the same situation with an older car and a car with a governor. Neither of these cars could pass safely. The congressmen were quick to see the built-in safety of a lively car and the definite hazards of governors.

It is also true that safety features must be accepted by the public. If they are too expensive, the public won't buy them. If they are clumsy, uncomfortable or if they detract from the appearance of the car the public won't buy them. And even when safety features are reasonably priced and appealing in other respects, the battle is not entirely won.

As you will probably recall, one auto manufacturer last year spearheaded its sales campaign with advertising

and promotion of safety features. Officials of that company found the effect disappointing to say the least. It seems the buying public was more interested in stock car records.

Of course that company will continue its efforts to educate the motoring public to safety features, as we will continue our efforts in that direction at Chrysler Corporation, but it is going to take time, a long time.

At the same time we must be effective in educating drivers—and, also pedestrians—to safety habits in and around automobiles. This more than any other single factor, seems to me to be the most effective approach to safety on the highways. We must create safety consciousness.

The Air Force wouldn't think of letting a recruit wander around an airfield before he gained a healthy respect for the intake of a jet plane. That respect is instilled by education and discipline.

In our plants, we wouldn't turn a new employee loose near a giant stamping machine until he knew everything about that machine—how it works, the necessary precautions to be taken in its use.

I know that in your own business, rigid safety standards have been established and scrupulously observed.

Why, then, should these same safety habits not be universally instilled in the motoring public?

The auto industry and many other groups have been working hard from this angle for some time. We can see some progress, but here is another area where more could be accomplished if the entire nation—every man, woman and child—could be enlisted in the campaign.

Considerable progress in awakening the public has been made by the Automotive Safety Foundation. You may be interested in knowing the circumstances that brought the Foundation into being.

In 1937, not very much attention was being paid to the spiraling highway fatality rate. The problem was one of apathy. The safety committee of the Automobile Manufacturers Association was doing what it could to get better highways, stricter law enforcement and other improvements, but progress was slow.

Then came the national jolt that was needed. One thing that helped to open people's eyes was a Readers Digest story that laid out in cold facts the degree to which traffic fatalities had gotten out of hand. That magazine article caused a tremendous stir, as you may recall. It opened the eyes of the nation.

With the prospect of more widespread support, auto industry representatives got together and agreed to start a group that would work on the problem on a broad front. The founders knew that the job was too big for the auto industry alone and so they immediately sought to enlist the support of other groups. The Foundation has grown steadily since that time and now counts among its membership companies in the petroleum, rub-

ber and cement industries and banks and insurance companies.

The auto industry to date has contributed over 10 million dollars to the Foundation and has pledged to match up to one million dollars a year any contributions from other groups.

With this money, the Foundation makes grants to the National Safety Council, police and traffic engineering training, The American Bar Association, the Grange, and many other groups working toward highway safety.

These grants certainly could not and are not intended to support a broad safety program. Essentially they are intended to prime the pump, to encourage various groups



"... better roads, high school driver education, vehicle inspection, uniform traffic laws, strict enforcement are necessary to improvement of safety."

to work for highway safety and to become self-supporting in their efforts.

In addition, the Foundation played an important role in framing the new Federal highway bill. Since 1940, the Foundation has worked tirelessly to encourage accelerated highway building. Studies conducted by the Foundation during the last 15 years were invaluable when the time came to write the bill. Certainly the Federal highway bill is the work of many, the Automotive Safety Foundation should be counted high on the list.

Recently I became a director of the Foundation. I consider this one of my most important jobs.

You will notice that as I have touched on some of the various phases of the highway safety problem, in each instance I was able to point to progress, and yet in most instances I mentioned that there was a great deal more that apparently could be done.

In the time available here today I can only outline the problem as I see it. This has served, I think, two purposes. It points out what a comprehensive and far-

reaching problem we are dealing with—one that obviously can have no piecemeal solution. And I have attempted to outline to you that in virtually every area of the attack on highway fatalities, more can be done—and more can be done with our present knowledge and resources.

The fact that more is not being done drives right to the heart of the matter and pinpoints it. We will make progress only to the degree that we are able to stir the enthusiasm and wholehearted support of the public as a whole and of the many national, state and local authorities within whose jurisdiction the operation of motor vehicles falls.

Tremendous concern is expressed in nearly every quarter about our traffic toll. Too often the attitude is to look for a scape goat, or just shrug and say that this is somebody else's problem.

When more people accept the fact that highway safety is their own personal job, when efforts to solve this problem are granted the wholehearted support they deserve, these things will happen:

Highway building and improvement on a local level will be stepped up to the point where it should be; every high school student who wants to drive will have the opportunity to be taught by a competent, experienced instructor; vehicle inspection will be universal; traffic laws will be uniform throughout the 48 states; law enforcement will be improved and tightened; traffic control will be greatly developed; and only capable drivers will be licensed.

I don't think this is too much to ask. None of these approaches is new or revolutionary. All of these steps are tested and proved as effective measures in combating highway mishaps. Certainly their universal application would substantially reduce the unnecessary death toll.

And I am personally convinced that when the nation sets aside its self interest and buckles down to lick this problem, the combined effect will work wonders on the emotional being that I mentioned earlier. It is not impossible that safe driving, and its inherent qualities of good citizenship, could become a more universal good emotion.

For our part, speaking for Chrysler Corporation, I can assure you that we will continue to do everything within our power both to design safer vehicles and to support with all our resources the attack on this national problem.

I am convinced personally that we will succeed in conquering this problem, as Americans have always succeeded in solving their big problems. We have come a long way toward that objective in just such appreciation of the matter that is evident from your invitation to me and your inclusion of a roundtable on highway safety in your program for this afternoon. This is all part of the American way of facing such tasks . . . facing them through free inquiry, frank discussion and with sound conclusion.

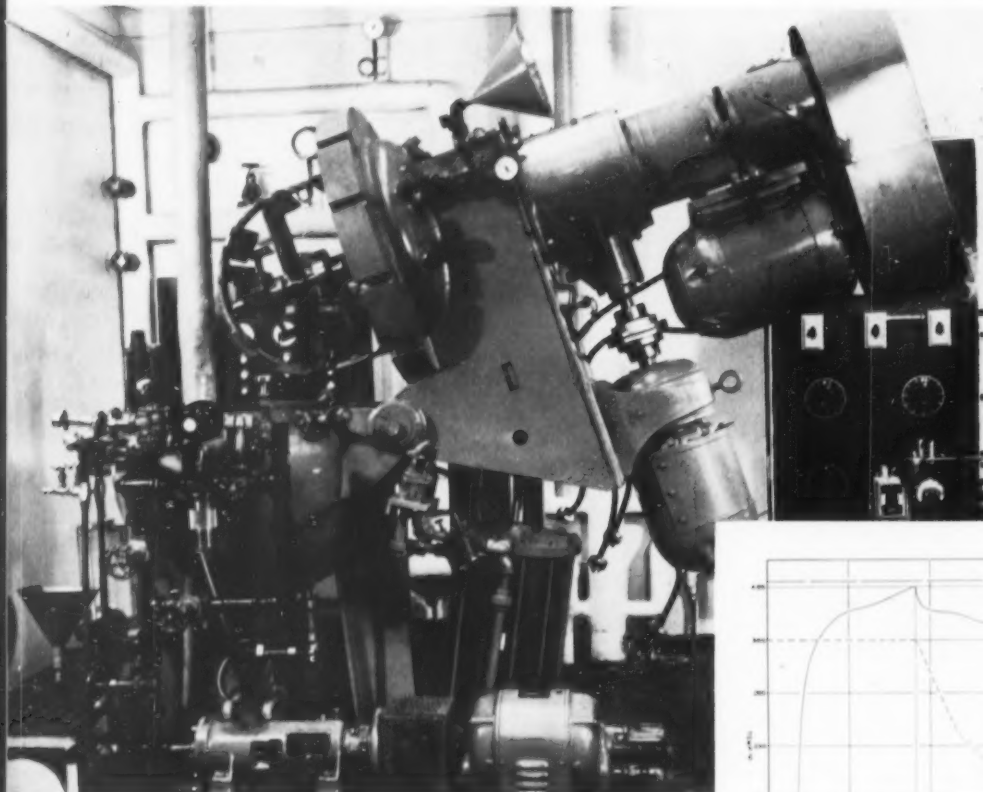
THE MANUFACTURE of lubricating greases, once considered an art, is rapidly becoming a science. Some pilot plant work has been completed on a new high performance type of grease mixer which gives every indication of being an important step in the progression from art to science. This paper reports on some of the work completed in a 30 gallon pilot unit. The first large commercial unit scaled up from the pilot data is illustrated.

Pilot plant work with the new equipment has proved that performance is very satisfactory on all types of greases. The first large commercial unit is now being built by the Struthers Wells Corporation for the Cities Service Oil Company grease plant, Cicero, Illinois.

In developing this new grease mixer, the object was to combine in one vessel the benefits of high speed intensive mixing with that of the best time-proved design of a

use is made of water for cooling. Heat transfer oil or other media could be used. The machine in the immediate foreground of Figure 3 is a small ND3 Charlotte colloid mill driven by a 3600 R.P.M.-7½ H.P. motor. A series "F" Roper gear pump with a variable speed Master Speed-ranger drive is used to recirculate the grease from the bottom outlet to the top of the kettle or to package through either a small motor driven Cuno filter or through the colloid mill.

The kettle has a closed top with two sight glasses, one with a light. Internal working pressure is 150 p.s.i.g. maximum or full vacuum. Vacuum up to 27" of mercury is obtained with a small Schutte and Koerting steam jet exhauster. As shown in Figure 4, the vessel cover with motors, drive assembly, and agitator, may be opened and closed by an air actuated cylinder. Agitator blades on the

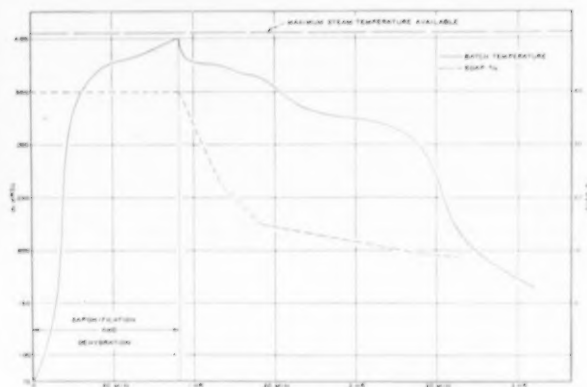


conventional counter-rotating wall-scraping type agitator. The basic problem of grease manufacture is to provide maximum uniformity of mixing and temperature control through viscosities ranging from those of light liquids to extremely heavy pastes. The pilot tests indicate this has been accomplished.

Experimental Pilot Unit

The pilot plant mixer is illustrated by Figures 3 and 4. In the East Chicago Laboratory the unit is heated with saturated steam in the jacket up to 260 p.s.i.g. and alternate

A New High



LEFT, Figure 4 is a pilot plant mixer—internal working pressure is 150 p.s.i.g. with vacuum up to 27" of mercury—vessel cover with motors, drive assembly, agitator is opened by cylinder.

FIGURE 1 is a graph of the process data typical of a lithium grease in a new Struthers Wells mixer.

center shaft are removable from the hubs and can be changed from radial propeller to conventional in a few minutes. The counter-rotating wall-scraping agitator may be operated at conventional speeds from the horizontal gear motor. The center shaft may be operated at high speed at any time by starting the vertical overdrive motor. Two Morse (Borg Warner) free wheeling clutches are used; one on the top gear of the two-motion drivehead and one at the top of the center shaft attached to the driven sheave powered by the vertical motor. No electrical interlocks are required.

The agitator selected for the high speed element of the new grease agitator combination is the Struthers Wells Radial Propeller Agitator. This agitator selection was based on several years of study of various types of agitators with particular reference to the specific problems of lubricating grease manufacturers. Articles of technical literature were reviewed. Manufacturers' technical bulletins agree that high speed impellers are not effective due to excessive cavitation or channeling in high viscosities such as exist during some stages of most grease processing. The purpose in combining the high speed radial propeller agitator and the conventional two-motion pitched paddle agitator is to utilize the folding action of the closely spaced pitched bars of the paddle kettle to move the viscous materials into the intense mixing zone. This overcomes excessive channeling and thus obtains maximum benefits of the intensive high speed mixing.

Performance Grease Mixer

By O. L. YARHAM and P. R. SIGLER
Cities Service Research and Development Company

The Radial Propeller Agitator

The radial propeller agitator was designed by Struthers Wells in an attempt to combine the advantages of the marine type propeller and the turbine type agitator. The vertical blade faces are at an acute angle from the tangent and propel material radially outward causing a mass flow pattern as illustrated by Figure 6. The high peripheral speed of the blades gives excellent mixing and shearing of the grease which is useful during soap formation, oil addition to the soap stock, and during dehydration.

The pumping action of the turbine feature of the agitator combined with the paddle kettle action brings rapid equilibrium throughout the grease batch and eliminates the extreme gradients of temperature, moisture and composition content now found in existing plant equipment. As a much higher rate of new surface is exposed, dehydration and deaeration, (under vacuum), is rapid.

Typical Pilot Plant Grease Processing

Process data on a typical pilot batch of multipurpose lithium grease is shown in Figure 1. It will be noted that rapid heat exchange, mixing, dehydration and deaeration is obtained. The finished grease shows excellent test properties.

Similar process data on a typical batch of anhydrous, 300°F. dropping point, calcium multipurpose grease is shown in Figure 2. It is found that saponification is apparently complete before the maximum temperature is reached.

The work with the pilot equipment has demonstrated that better control of process variables can be obtained than is possible by the use of any other equipment known to be in use. Over-all manufacturing time savings ranging from 30 per cent to 80 per cent of present time cycles are indicated.

Over-all heat transfer coefficients ranging from 1½ to 4 times those obtained in the same unit with the conven-

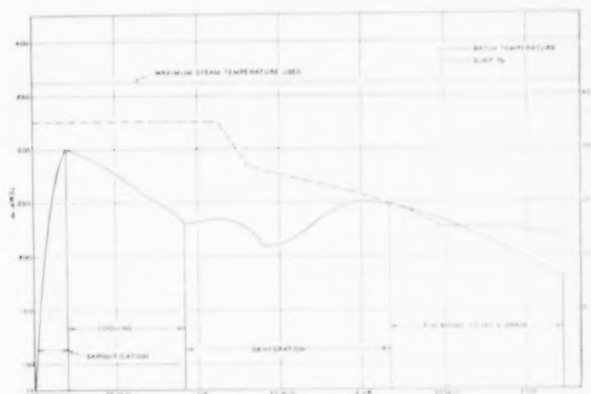


FIGURE 2 gives process data for multi-purpose calcium grease mixed in a Struthers Wells mixer.

tional agitator have been obtained with the new combination agitator.

Figures 7 through 16 illustrate some of the data which was obtained in testing the pilot size mixer. Some of this data was found useful in evaluating and understanding the performance of the pilot unit and other of the data was useful for the design of and estimating the performance of the first large commercial unit.

Figure 7 shows the effect of the radial propeller-scraper type sweep frame agitator combination compared to the conventional agitator in heating a No. 2 N.L.G.I. grade of multipurpose lithium soap base grease. For all three curves, the scraper sweep frame agitator was con-



FIGURE 3 Machine in immediate foreground is an ND3 Charlotte colloid mill. Series "F" Roper gear pump recirculates grease to top of the kettle.

stant at 20 R.P.M. and the only variable was the center agitator. For the curve marked "CONVENTIONAL" the center shaft speed is 30 R.P.M. With the steam in the jacket in each case condensing at 356°F., the following times were required to heat the grease from 125°F. to 340°F.:

Conventional Agitator	120 Minutes
6° Pitch Radial Propeller @ 830 R.P.M.	31 Minutes
6° Pitch Radial Propeller @ 415 R.P.M.	57 Minutes

Figure 8 shows the results obtained with the same agitator combinations when cooling the lithium No. 2 grease. For the three solid line curves, the jacket cooling water inlet temperatures and flow rates were identical. The broken line shows the need for additional flow of cooling medium when the radial propeller is operating at the higher speed of 830 R.P.M. This is to compensate for the heat effect of the increased horsepower input to the agitator.

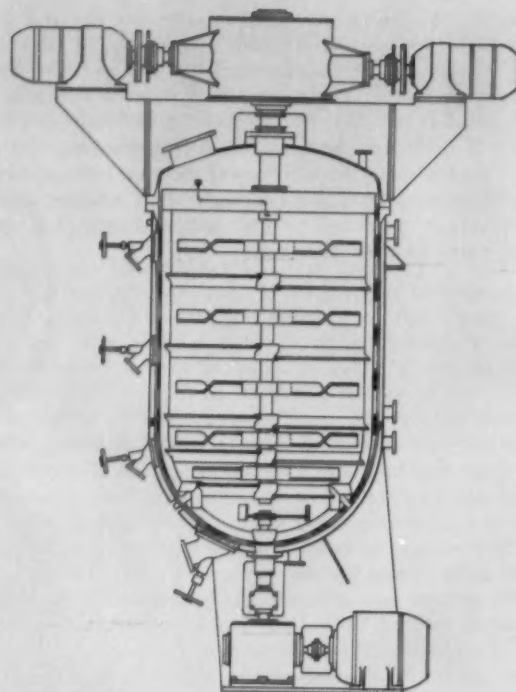
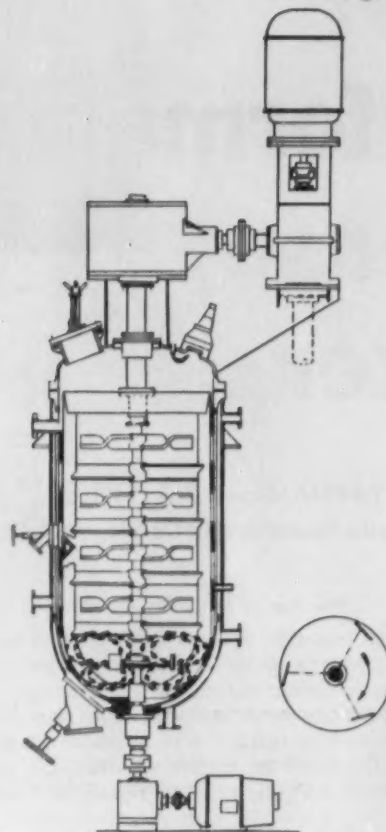
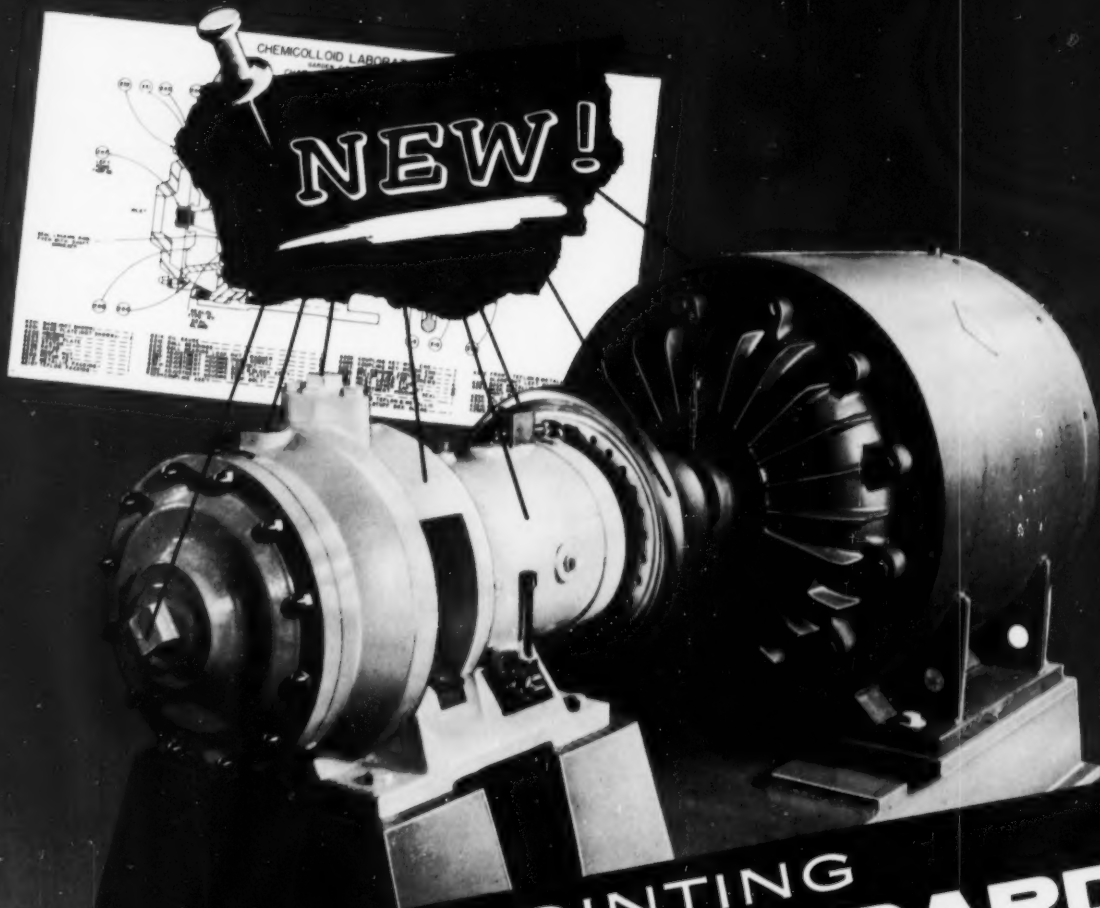


Figure 5

Figure 6





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Figure 7

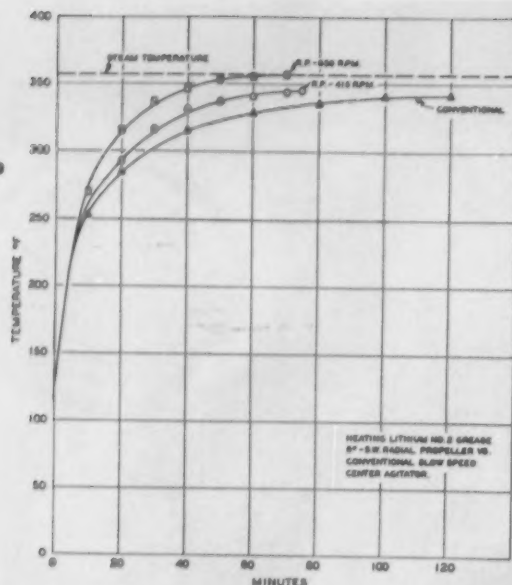


Figure 8

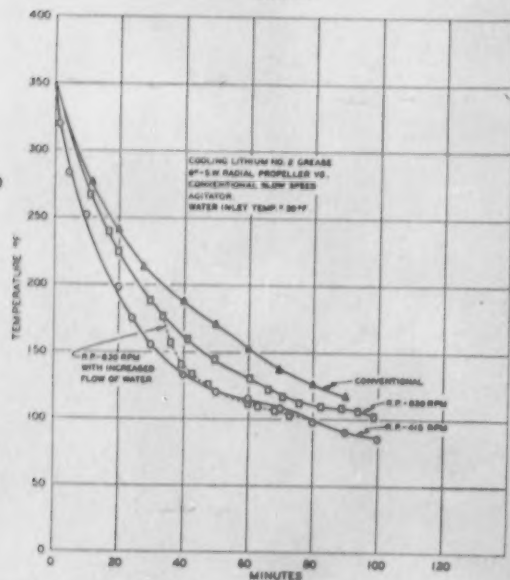


Figure 9

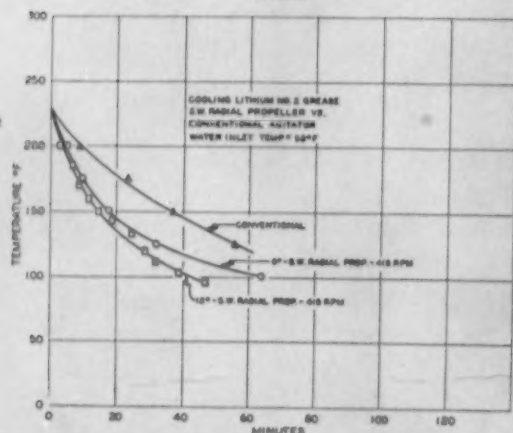


Figure 9 shows some of the data obtained to determine the optimum pitch of the radial propeller blades.

Figures 10, 11 and 12 give some indication of the heat effect from agitation of the radial propeller agitators. The radial propeller drive motor loads are also plotted against temperature. The amount of grease in the mixer was 220 pounds. As no heat was added to the jacket during the test runs, the heat input to the grease was greater than that shown by the temperature-time curves because heat was absorbed by the agitator metal and the metal in the kettle shell. Some of this heat was lost by conduction of heat from the shell to other metal parts of the vessel and in turn to the surrounding air by convection and radiation.

Figure 13 shows performance curves for the radial propeller drive motor. This data was obtained from the motor manufacturer, the Louis Allis Company. The drive motor is 5/2.5 H.P.—1800/900 R.P.M. and is a constant torque general purpose induction motor. By the use of this data and the temperature-load curves of Figures 10, 11, and 12, the total energy input to the radial propeller can be expressed in terms of heat units to determine the amount of the heat developed which was retained by the grease batch and the amount absorbed by the equipment and lost by heat loss to the surrounding air.

Figure 14 gives some information on the relative horsepower requirements of the pilot size radial propeller agitator at two pitch settings of the blades and at two speeds. Weight of the vessel contents was again 220 pounds. The broken line curve represents tests taken with 220 pounds of the mineral oil component alone. It is of some interest and significance to find that the power curve for the mineral oil somewhat parallels the power curve for the grease containing the same oil.

Figure 15 shows test data obtained on power requirements of the radial propeller agitators as measured in a viscous mineral oil. The pilot mixer was charged with 220 pounds of the oil. For all the test data taken, the sweep frame agitator speed was constant at 20 R.P.M. It is worthy of note that for the 12° pitch agitator all the power curves are straight lines through all test speeds measured up to and including 950 R.P.M. For the 6° pitch agitator, the power curve was a straight line at 425 R.P.M. At 830 R.P.M. considerable curvature developed. This indicates additional slippage and shear on the product near the blades with some loss of pumping action of the vertical pitched blades and less mass flow.

The power curves of Figure 16 represent typical curves which show the effect of grease consistency on the radial propeller drive motor load. The quantity of grease in the vessel was approximately 220 pounds in each case and the counter-rotating scraper sweep frame agitator was again constant at 20 R.P.M. The numbers represent respective N.L.G.I. consistency grades. The mineral oil in these greases was 102 V.I. solvent refined oil with a viscosity of 696 S.U.S. @ 100°F.

STAYS

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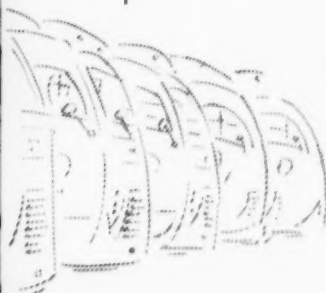
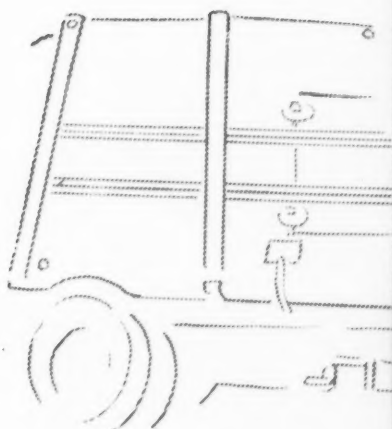
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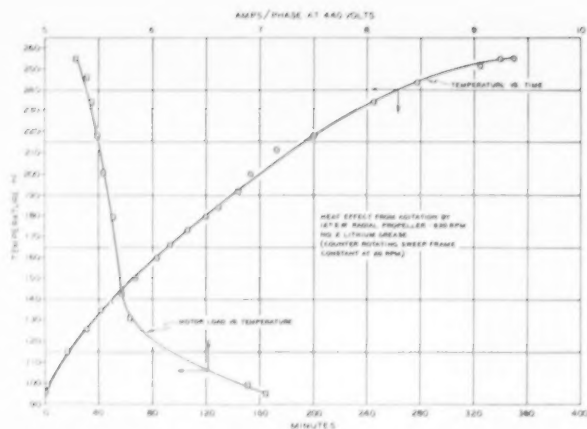


Figure 10

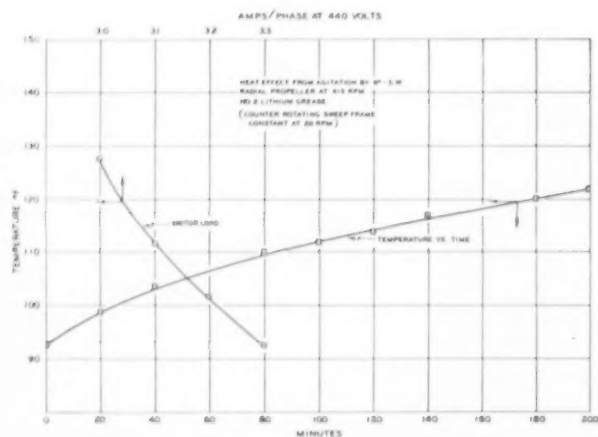


Figure 11

The Agitator Combination

Observations and physical and chemical tests based on work with the 30 gallon pilot unit indicate important practical benefits may be obtained from the high speed agitator at all or nearly all stages of grease processing. During soap formation under pressure, the vessel contents range from very fluid to moderately fluid. At this stage, the radial propeller creates a rapid overturning of the vessel contents, (mass flow), and as the processed material passes the agitator blades an intimate contact of reacting ingredients is obtained. Soap formation is apparently completed before the maximum temperature is reached. In the case of the grease process illustrated by Figure 2, this time to reach the maximum temperature was 12 minutes.

During the fluid soap formation stage, the slow moving sweep frame and pitched agitator bars act as baffles to overcome excessive swirl of the vessel contents. The hemispherical shape of the bottom head of the vessel is quite useful in determining a desirable flow pattern and in providing a reasonable depth of contents. This is particularly useful in processing some of the newer low soap content greases.

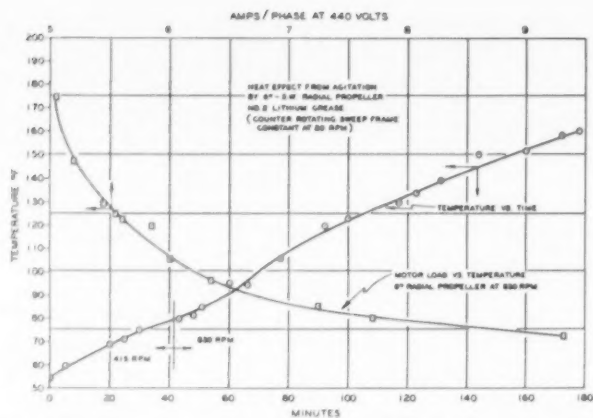


Figure 12

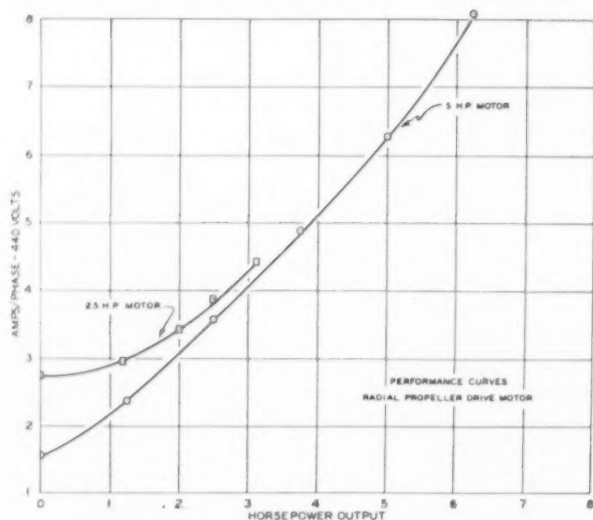


Figure 13

As the high soap content material is allowed to dehydrate, the mass becomes more viscous and the load on the radial propeller drive motor is noted to increase on the load indicating ammeter. (A smaller typical load increase is also observed during the previous pressure cooking as the soap is first formed.) When the dehydrated high soap content material becomes more viscous, the folding and axial flow action of the slow moving pitched horizontal paddle blades serves to move the material into the intense high speed mixing zone.

After the desired degree of dehydration has been obtained, mineral oil is added to the vessel to reduce the product to the desired consistency. The load indicating ammeter on the radial propeller drive motor is very useful in determining the proper flow rate of oil addition in processing some greases.

Full Scale Equipment

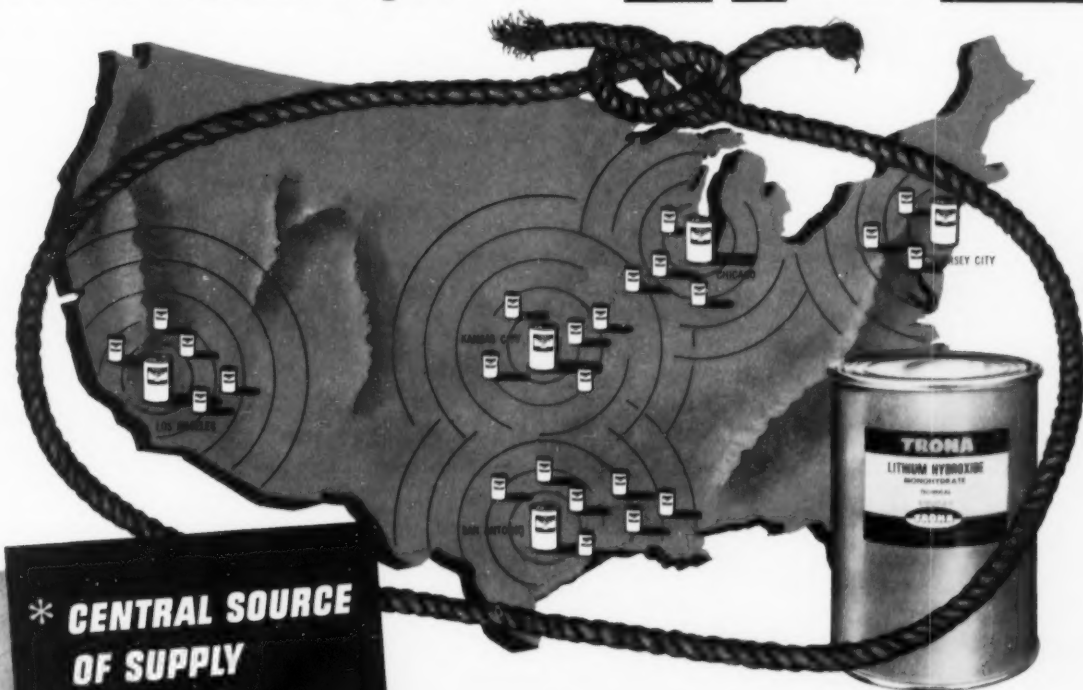
The first commercial size grease mixer based on the pilot plant unit is illustrated by Figure 5. This kettle will have a working capacity of 22,500 pounds of grease per batch. The sweep frame agitator and the center paddles

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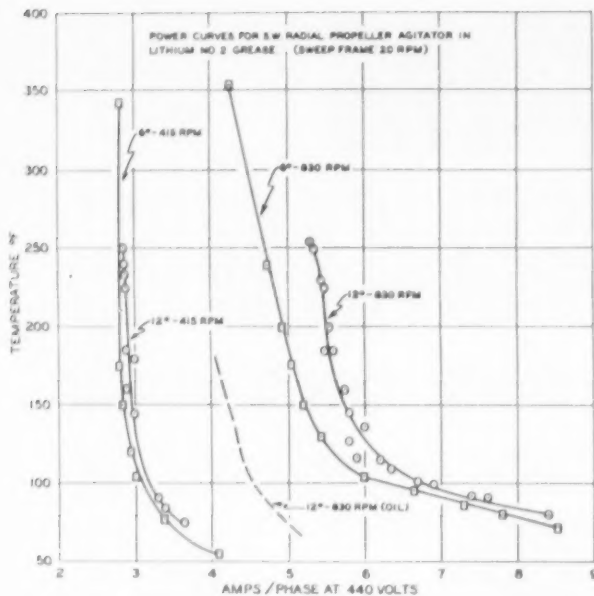


Figure 14

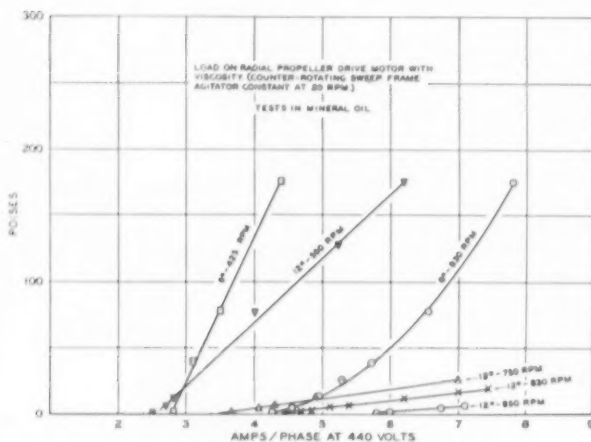


Figure 15

each are independently driven by one of the top two-speed constant torque drive motors. The bottom radial propeller drive motor is four-speed constant torque. In the design of this unit, none of the best useful features of the time-proved counter-rotating wall-scraping type of grease mixers have been eliminated and an important new feature has been added. This unit is scheduled for operation about March, 1957.

Continuous Grease Manufacture

On grease products where sufficient volumes exist to merit the installations, the writers believe that multiple units properly matched for sizes could be arranged for continuous or semicontinuous operation in order to obtain any possible benefits from such operation. Intermittent return to batch processing could be made with a minimum of time and effort with little if any loss of the flexibility of operation inherent in batch equipment. ■

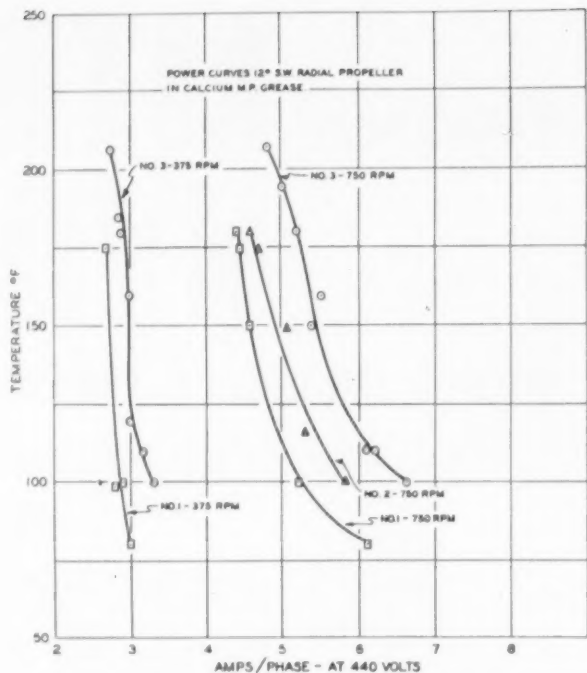
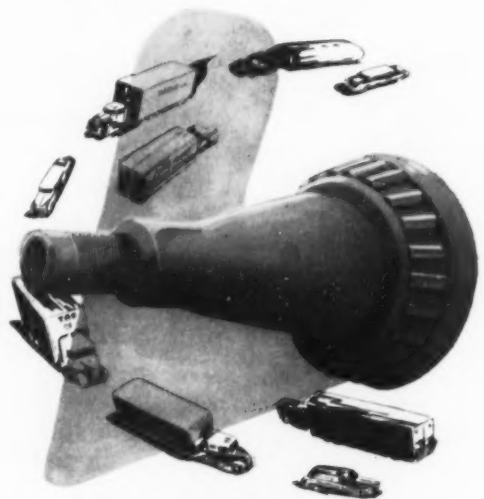


Figure 16

RECOMMENDED PRACTICES for Lubricating Automotive Front Wheel Bearings

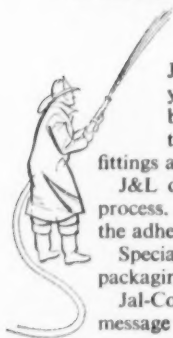


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B

A

A. RE-ELECTED to NLGI's Board of Directors . . . Landis, Merkle, Albright.

B. STARR (right) receives congratulations from Board men Clark, Rosenstiehl.

C. NLGI Immediate Past President Murray chats with President-elect Lane.

D. NEW Vice President Cubicciotti, re-elected Treasurer Daniel.

E. 1955's President Hemmingway awards Murray past president's pin.

F. "CONTINUED service to the industry . . ." pledges the president.

C

D





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NLGI ELECTS . . .

J. W. Lane was elected president of the National Lubricating Grease Institute at the 24th annual meeting, October 22-24, in Chicago . . . the new vice president is R. Cubicciotti and A. J. Daniel was re-elected to his fourth consecutive term as treasurer. Six directors were re-elected to the eighteen-man Board of Directors, including W. M. Murray, J. W. Lane, W. W. Albright, J. V. Starr, G. Landis and G. E. Merkle . . . they will each serve three-year terms, concluding with the annual meeting in 1959. President-elect Lane served as vice president in

1956, acting in the capacity of chairman for the program and NLGI movie committees. He succeeds W. M. Murray, immediate past president. R. Cubicciotti has served on many Institute committees and chairmanned the 1956 publicity committee. A. J. Daniel has served three terms as treasurer and is a former president (1950) of NLGI. The NLGI SPOKESMAN joins with the rest of the organization in offering congratulations and best wishes to the new officers and to the members of the Board of Directors of the National Lubricating Grease Institute.

E



F



Patents and Developments

Process for Preparing Lubricating Compositions

For lubricating some types of anti-friction bearings, particularly ball bearings, the grease composition necessary to furnish the desired long and continuous lubrication at elevated temperature is a "channeling" type grease. That is to say, a grease which gives a low torque and low bearing temperature rise is needed since, in an operating bearing of this type, the major portion of the grease is pushed out of the path of the rolling elements during the first few revolutions of the bearing, and remains out of this path. Thus, no unnecessary power loss or heat build-up occurs in moving the grease in the bearing after the first few minutes of operation. This "immediate channeling" type grease has been obtained by high soap concentration, the grease structure being modified during manufacture to obtain a relatively high penetration. The excess grease thrown out of the ball path then acts as a lubricant reservoir and as a seal to prevent entrance of dirt and other undesirable contaminants into the lubricated bearing. The requirements of a grease of this type are as follows: a high dropping point, usually in excess of about 350° F.; soft, unctuous characteristics; and a stable structure, as indicated by an ASTM worked penetration value of 200 to 350 mm./10. An "excellent" channeling type

grease is claimed to be described in detail in Patent No. 2,265,791. The grease composition of this patent is prepared by thickening a mineral lubricating oil to a grease consistency with a relatively large proportion of the sodium soap of refined rapeseed oil. There is also present in the finished formulation a slight excess of sodium hydroxide. There may also be present, if desired, a small percentage of an oil soluble petroleum sulfonate. This grease composition is said to give excellent long continuous service in both high and low temperature ball bearing operation.

In general, the channeling type lubricating grease compositions described above are claimed to be excellent for lubricating ball bearings. These greases, however, are less desirable for use in roller bearings since different and more complex lubrication problems exist in these bearings. It has been found that the action of both ball and roller bearings causes the high soap content grease compositions to become stiffer, and the desired soft, unctuous characteristic necessary for bearing lubrication is lost. While this hardening is desirable in ball bearing use, allowing ease of channeling, it is undesirable in roller bearing service, since hardening and channeling prevent satisfactory



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Unsaponifiable (Wool Grease Alcohols)	6% max.
Saponifiable	94%
Free Fatty Acid (as oleic)	55-60%
Actual Free Fatty Acid Content	90%
Saponification No.	120-130
Free Inorganic Acid	0.2% max.
Iodine Value	20-40
Apparent Solidification Point (titre)	Approx. 44° C.
Softening Point	45-48° C.
% Sulfur	No corrosive sulfur

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lubrication of the roller shoulders and back roller surfaces. This is particularly noticeable in double row bearings. These prior art channeling greases also tend to harden on storage because of the unbalanced grease structure, that is, the abnormally high proportion of soap to oil base. Upon standing, the grease which has been churned or stirred down to the desired consistency (penetration) tends to settle, or "snap back" to the consistency which is normal for the high soap content. In addition to the hardening action of these prior art lubricating grease compositions, one serious production handicap is the time used in cooling the grease formulation from kettle temperatures, approximately 480° F. to 520° F., to packaging and handling temperatures. This cooling ordinarily takes from 24 to 36 hours, thus tying up production equipment for an undesirable period of time.

In U. S. Patent 2,745,810 issued to Esso Research and Engineering Company, there is disclosed the formation of a lubricating grease having desirable high temperature properties suitable for use in ball or roller bearings by a process which utilizes a combination of a quick cooling technique coupled with a subsequent application of high rates of shear without concurrent mixing. This improved technique results in the following advantages:

1. Greases having channeling properties and proper consistency which will satisfactorily lubricate anti-friction bearings without undesirable loss of power, heat rise, or premature bearing failure.

2. Decreased tendency to harden during use in a roller bearing, thus maintaining the proper consistency to work into roller bearing crevasses and shoulders during use.

3. Decreased tendency to harden during storage, since the desired consistency (penetration) is achieved with a lesser amount of soap than was hitherto believed possible.

4. An obvious economic advantage due to retention of the required consistency for anti-friction bearing lubrication (200-350 mm./10 penetration) with considerably smaller amounts of soap than the prior art has heretofore thought necessary.

5. A reduction of processing time from the ordinary 24 to 36 hours to about 2 to 10 hours.

Briefly speaking, the patent involves a process for the preparation of high temperature lubricating grease compositions which comprises the steps of preparing a mixture of a complex soap and a low viscosity mineral oil, heating the mixture to a temperature above about 480° F. to completely dissolve the soap, and cooling the mixture to a temperature of about room temperature to 250° F. at a cooling rate such that an overall cooling time of from 2 to 10 hours is required. When the formulation has reached this temperature additional mineral oil of a viscosity index substantially higher than that of the base oil used is added, and the total mixture is subjected to high

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rates of shear without concurrent mixing to form the desired final product.

As was stated above, the first step in this improved process is the formation of a mixture of a complex soap and mineral oil.

By "complex soap" is meant those thickening agents which comprise a complex of two or more components. Complexes may be formed from high molecular weight acid soaps and low molecular weight acid salts, such as the salts of acetic, acrylic, methacrylic, furoic acid, etc. Rapeseed oil soap is one such complex soap and is utilized in the preferred embodiment of this invention.

It has been found in the prior art that the metallic soaps, preferably the sodium soaps of refined unblown rapeseed oil, produced a grease formulation having desirable high temperature properties. The sodium soap of rapeseed oil is ordinarily prepared by admixing the rapeseed oil with a portion of a mineral base oil, usually the coastal type oil having excellent soap solvency properties but relatively low flash and correspondingly high volatility inherent in lube oils derived from aromatic type crudes. A viscosity index within the range of from about 45 to 60 is desirable. An aqueous solution of the desired metal hydroxide is then added. The temperature is raised gradually to one at which the neutralization products of the rapeseed oil become completely soluble. Ordinarily, this will be within the range from about 480° to 520° F. or higher.

Any addition agents used, such as oxidation inhibitors, petroleum sulfonates and the like, are added along with any additional quantity of the base oil used prior to the final temperature attained; that is, they are usually added at a temperature in the range of 250° F. to 300° F.

In the prior art, it has been the general procedure to allow the mixture to cool slowly to packaging and handling temperatures, that is, to about 200° F. to 275° F. It had been found that this slow cooling technique resulted in the grease composition having longer lubrication life and superior structure characteristics. It has been postulated that this is due to a gradual increase in soap particle size to the optimum.

As was pointed out above, this slow cooling technique results in product equipment tie-up and is overall economically unadvantageous. The procedure of the patent involves the elimination of this long cooling time by a rapid chilling procedure. This may be done by circulating cold water through the kettle jacket or any other method of rapid heat exchange known to the art. With the instant process these cooling times of from 24 to 36 hours may be shortened to from 2 to 10 hours, depending on the form of heat exchanger used.

Once the grease formulation is cooled there is added thereto an additional quantity of a highly refined paraffinic base mineral oil having a viscosity index within the range of 80 to 115, and the total mixture is then subjected to a high rate of shear without concurrent mixing.

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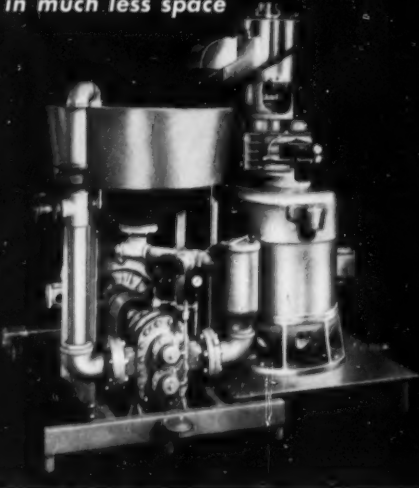


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It is essential that the mineral oil used to "cut back" the grease formulation have a high flash point with corresponding low volatility and be of a natural high viscosity index within the stated range. The effect of any viscosity index improvers added to the mineral oil is lost since the improvers crystallize out on the soap particles and the original viscosity index of the base oil is the only effective one. This type of oil cannot be employed as the initial soap dispersant due to insolubility of the molten soap. It has also been found that if the grease formulation is prepared by the ordinary slow cooling method additional high viscosity index mineral oils cannot be incorporated therein.

After the grease formulation has been cut back with the high viscosity index oil, the total mixture is subjected to rates of shear in the order of 10,000 to 500,000 or more in an apparatus designed to deliver these rates of shear without concurrent mixing. This equipment is so designed as to cause the grease to flow at high velocity and high pressure under streamlined conditions. Equipment such as the Gaulin homogenizer, or rolling mills wherein the grease formulation passes through steel rollers with minute clearances may be used. The well known Morehouse Mill wherein the milled material passes through spinning discs at low clearances is also operable but less desirable. A pressure viscosimeter if operated at sufficiently high pressures to deliver rates of shear within the desired range may be used to achieve the desired results.

The original soap content used will be such as to give a grease formulation containing from 20% to 50% soap before the addition of the high viscosity index mineral oil. It has been found that by the former slow cooling method of the prior art a soap content within this range is required to give the desired ASTM penetration of 200 and 350 mm./10. The additional quantity of high viscosity index mineral oil added will be such as to reduce the overall soap content of the final product to one within a range of from 6 to 18%. The subsequent treating step, subjection to the high rates of shear without concurrent mixing, results in a finished product having a penetration value of between 200 and 350 mm./10, preferably 275 and 300 mm./10. It is to be noted that, in addition to appreciably reducing the cooling time needed, a lubricating grease having a penetration within the desired range is obtained with a fractional amount of the total soap hitherto thought necessary.

The lubrication life of an anti-friction bearing lubricant has been thought to be generally proportional to the amount of soap present. It has been found that the lubricating compositions of this patent containing approximately 1/4 to 1/3 the amount of soap hitherto thought necessary, gives a lubricating life comparable to the prior art greases. This is due to the incorporation of the high viscosity index oil, a result that cannot be achieved using the ordinary slow cooling techniques familiar to the prior art.

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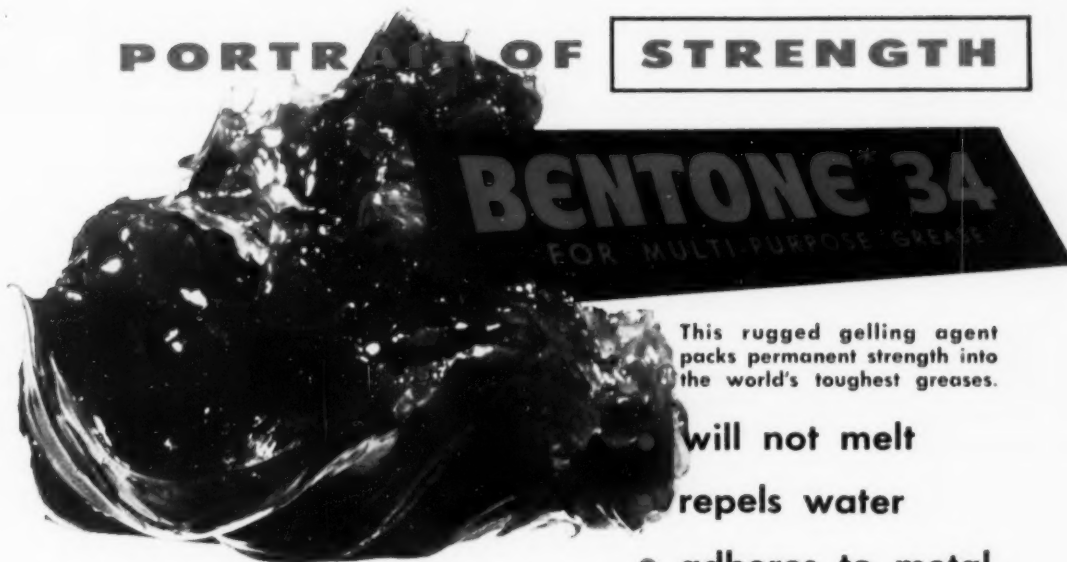
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EXAMPLE

By the procedure outlined in detail below, a grease composition having the following formulation was prepared:

INGREDIENTS	Percent	
	By	Weight
Rapeseed Oil.....	22.00	
Sodium petroleum sulfonate solution.....	0.50	
Sodium hydroxide.....	4.75	
Oxidation inhibitor.....	1.00	
Metal deactivator.....	0.50	
Mineral oil (from a coastal crude)— 300 vis./100° F. (V. I. 50).....	71.25	

Manufacturing procedure.—The rapeseed oil, sodium petroleum sulfonate (50% solution in oil), and one third of the mineral oil were charged to a fire-heated grease kettle and warmed to 150° F. An aqueous solution of sodium hydroxide (40%) was charged and the mass heated while stirring to 300° F. After dehydration of the mass, the balance of the mineral oil was added and the grease was heated to 500° F. At this temperature heating was discontinued and the grease cooled to 200° F. While cooling (about 275° F.), the inhibitors were added. At 200° F. the grease was drawn and filtered. The cooling rate in this example was such that from 20 to 22 hours

were needed to reach the packaging temperature of 200° F.

This grease composition had the following standard grease inspections:

ASTM penetration (mm./10, 77° F.):

Unworked	318
Worked (60 strokes)	326
Worked (100,000 strokes).....	317
Dropping point (°F.)	500
Free alkalinity (as per cent NaOH).....	0.32
Norma Hoffman oxidation tests (hours to 5 p.s.i. drop in oxygen pressure).....	286

This grease was submitted to the standard ABEC-NLGI 204 ball bearing spindle life test and gave excellent results. This test is described in detail in the literature and consists, briefly, of operating a 204 ball bearing lubricated with the test sample at 10,000 R.P.M. at a temperature of 250° F. until the bearing fails. The grease of the example gave a lubrication life of 1900 hours.

These data and the accompanying drawing point out the improvement to which the instant process relates. Examples 1 and 2 show that a grease having good structural characteristics and good spindle life may be prepared by cutting a slow cooled prior art 24% soap grease to 18% soap content with a low viscosity index oil followed by homogenization. Example 3 points out that a high viscosity oil may not be used as a cut back oil

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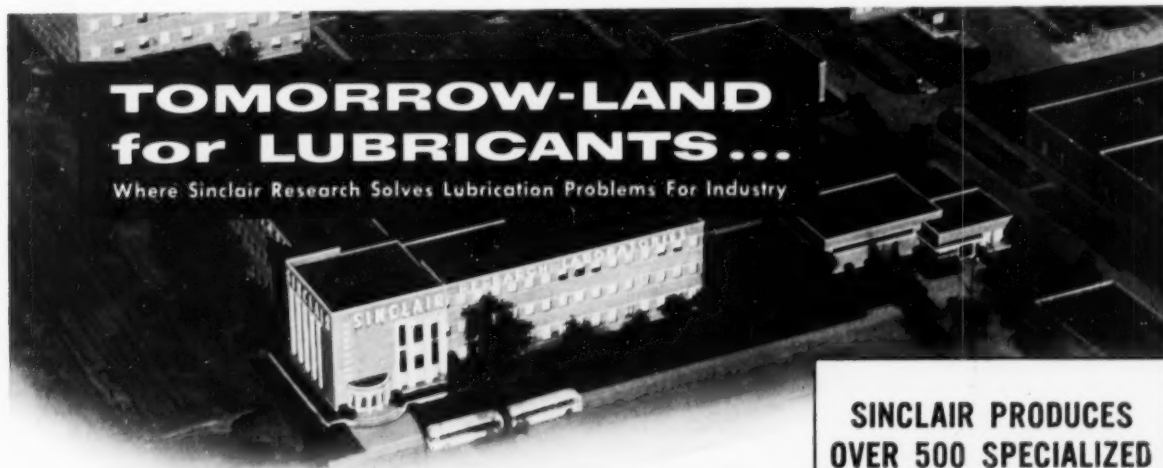
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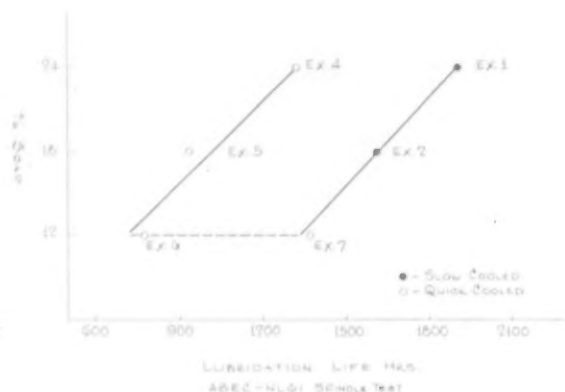


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when the slow cooling technique is used. Examples 4 to 6 show that when a quick cooled grease is cut back with a low viscosity index oil lower spindle life results are obtained. Example 7 illustrates the patent in that it clearly points out the advantages of the instant process. A grease having only 12% soap is prepared by the quick cooling technique and yet its spindle life is greatly improved and its structure is within the desired penetration range.



To summarize briefly, this patent involves the steps of preparing channeling type high temperature lubricating grease compositions which are useful for the lubrication of anti-friction bearings which comprises admixing a complex soap with a low viscosity mineral base lubricating oil that is of a viscosity index below about 60. The mixture is then heated to a temperature which is sufficient to completely dissolve the soap. The solution of oil and soap is then quickly chilled to a temperature which is below the transition temperature of the soap, that is, the temperature at which the crystallization of the soap occurs. After the soap has been cooled there is admixed therewith an additional quantity of the mineral oil but one having a viscosity index that is substantially higher than that of the base oil. Highly refined paraffinic oils having viscosity indices of about 80 to about 115 are especially desirable. The total mixture is then hardened to an ASTM penetration within the range of about 200 to 350 mm./10 by subjecting to high rates of shear with concurrent mixing. Rates of shear in the order of 10,000 to 500,000 reciprocal seconds, preferably 100,000 to 400,000 are operable.

Hydrophobic Silica Base Lubricants Containing 1, 3-Diols as Anti-Gelation Agents

The preparation of thickened oils or greases by incorporating in an oil a suitable minor amount of colloidal silica is well known. Patent No. 2,260,625 describes the use for this purpose of colloidal silica which may be either in the form of an aerogel or a so-called petro-gel. The colloidal silica acts as a thickening or bodying agent, and a relatively small amount, such as 10% by weight of silica in the mixture, will yield a composition having the consistency of conventional soap greases.

Ordinarily, silica is hydrophilic, having greater affinity for water than for oil. This is disadvantageous for lubri-

cant manufacture, since the grease containing the hydrophilic silica will tend to break down or lose its rigidity in the presence of water as a result of preferential wetting of the silica by the water causing separation of silica from oil.

In order to prepare silica base lubricants which are stable in the presence of water, it is known to employ silica which is hydrophobic rather than hydrophilic. Silica can be made hydrophobic in various ways generally involving the incorporation on its surfaces of a small amount of material which has no affinity for water. Examples of procedures for rendering silica hydrophobic appear in Pat. Nos. 2,583,603 and 2,583,606, wherein treatments of hydrophilic silica with materials such as styrene and alkyl silicon chloride are disclosed. Treatment of silica with various silane compounds such as described in Pat. No. 2,614,135 also can be employed to render it water-proof. These and other procedures may be used in preparing colloidal hydrophobic silica for use in grease manufacture.

A disadvantage in using hydrophobic silica as the thickening agent in preparing grease is that the resulting compositions have considerable tendency to undergo gelation when used at high temperature. This is undesirable since the grease stiffens as gelation occurs and, consequently, may lose its lubricating effectiveness under service conditions involving relatively high temperatures.

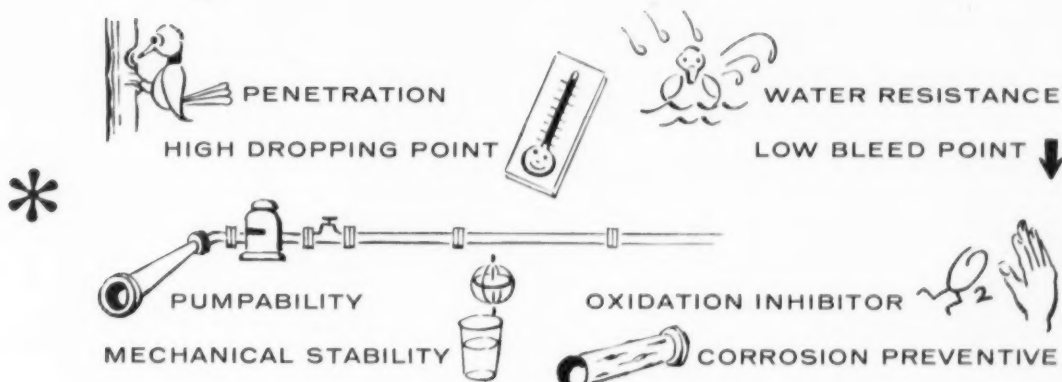
According to U.S. Patent 2,752,310 issued to Sun Oil Company, such gelation is substantially avoided or reduced by incorporating in the grease a minor amount of an aliphatic glycol having 6-12 carbon atoms per molecule and in which the hydroxyl groups are attached to carbon atoms separated from each other by one carbon atom. For example, aliphatic 1, 3-diols, 2, 4-diols, 3, 5-diols, etc., can be used. Preferred members of the group specified are 2-alkyl substituted-1, 3-diols such as the following: 2-methyl pentanediol-1, 3; 2, 2-diethyl propanediol-1, 3; 2-ethyl hexanediol-1, 3; 2-ethyl 2-butyl propanediol-1, 3; 2-butyl heptanediol-1, 3; and 2, 2-dipropyl hexanediol-1, 3. However, any other aliphatic glycol of 6-12 carbon atoms that has its hydroxyl groups on carbon atoms which are attached to a common carbon atom are operative for reducing high temperature gelation and can be used in practicing the invention.

In preparing a grease according to the patent, the amount of colloidal hydrophobic silica generally should be about 5-15% by weight of the oil-silica mixture, with about 10% usually being a preferred amount. The aliphatic diol is incorporated in the mixture in sufficient amount to inhibit gelation to the extent desired. The amount of diol will vary, but usually should be in excess of 2.5% by weight based on the silica, in order to have substantial effect on the gelation characteristics of the grease. On the same basis, 10% of the diol usually will stabilize the composition to substantial degree, and it is seldom necessary to add more than 50% for securing the desired results, although larger amounts may be desirable in some instances.

As specific examples of the patent, a series of compositions was prepared by incorporating in a base grease small amounts of various aliphatic diols as shown in Table 1. The base grease was prepared by mixing 10 parts by

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weight of a colloidal hydrophobic silica, known commercially as "GS Hydrophobic Silica," in 90 parts of a solvent refined distillate oil having the following properties: S.U. viscosity @ 100° F. = 515; V.I. = 90; A.P.I. gravity = 29; flash point = 455° F.; fire point = 515° F.; pour point = 0° F. A Manton-Gaulin homogenizer was used to insure complete dispersion of the silica in the oil. Diols in the amounts listed in Table I were worked into samples of the base grease by hand mixing. Each sample was then heated and maintained at about 300° F. for seven hours. Thereafter penetrations of the heated material were determined before and after working it with a spatula on a flat surface. The difference in these penetration values of the heated grease was taken as an indication of the gelation characteristics of the material; the lower the difference, the less being the gelation tendency. In these tests, the penetrations were determined, according to the procedure described in an article appearing in *Analytical Chemistry*, vol. 22, page 1574 (1950), entitled "Improved miniature penetrometer cones for determining lubricating grease consistency," the procedure involving the use of a half-scale cone as described in said article. Penetrations of the grease compositions before heating were also determined in the same manner.

Table I shows results obtained with the base grease

and for samples prepared according to the patent. Table II shows comparative results employing glycols not considered satisfactory according to the patent.

The results in Table I show that each of the glycols there listed is effective for the purpose of preventing undue gelation or stiffening of the grease during heating. While the base grease had a +58 change in penetration upon working of the heated material, the glycol-containing compositions of Table I exhibited much lower penetration changes. Furthermore, these compositions were all of smooth, non-granular texture desirable for a grease product.

By way of comparison, the results in Table II indicate that the glycols there listed are not satisfactory for use according to the patent. While the five glycols listed in Table II which had less than six carbon atoms effected some reduction in the penetration between worked and unworked material, they are unsuitable because the compositions containing them are granular and crumbly. On the other hand, the diisobutylene glycol, which has eight carbon atoms but has its hydroxyl groups on adjacent carbon atoms at the 3, 4-positions, does not adversely affect the texture of the mixture; but it has essentially no effect in preventing gelation as shown by the +57 penetration change.

TABLE I

Glycol Added	Wt. Per Cent Glycol Based on Silica	Texture of Mixture	Penetration (a) 77° F.			Penetration Change Upon Working
			Initial	Heated Un-worked	Heated worked	
(Base Grease)		Smooth	168	115	173	+58
2-methyl pentanediol-2, 4	1.0	Smooth	181	156	178	+22
	2.0	Smooth	174	157	173	+16
	3.0	Smooth	179	158	171	+13
	6.0	Smooth	183	164	167	+3
2-methyl pentanediol-1, 3	1.0	Smooth	179	153	175	+22
	2.0	Smooth	176	154	164	+10
	3.0	Smooth	179	154	165	+11
	6.0	Smooth	180	154	159	+5
2, 2-diethyl propanediol-1, 3 ...	1.0	Smooth	185	168	181	+13
	2.0	Smooth	184	167	172	+5
2-ethyl hexanediol-1, 3	0.5	Smooth	193	162	197	+35
	1.0	Smooth	185	174	188	+14
	2.0	Smooth	185	181	189	+8
Diisobutylene glycol-3, 4	1.0	Smooth	187	172	187	+15
	2.0	Smooth	181	179	184	+4

TABLE II

Glycol Added	Wt. Per Cent Glycol Based on Silica	Texture of Mixture	Penetration (a) 77° F.			Penetration Change Upon Working
			Initial	Heated Un-worked	Heated worked	
Ethylene Glycol	2.0	Granular	168	95	122	+27
Butanediol-1, 3	2.0	Granular	172	128	148	+20
Butanediol-2, 3	2.0	Granular	174	129	155	+26
Pentanediol-1, 5	2.0	Granular	176	126	159	+33
Pentanediol-2, 4	2.0	Granular	174	135	157	+22
Diisobutylene glycol-3, 4	2.0	Smooth	185	122	179	+57

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THICKENER PARTICLE DIMENSIONS
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FORCES RESPONSIBLE FOR
LUBRICATING GREASE STRUCTURE

PRACTICAL SIGNIFICANCE OF
MECHANICAL STABILITY

COMPARISON OF LABORATORY
AND FIELD BLEEDING TESTS FOR
LUBRICATING GREASES

GREASE SHEAR STABILITY

A NEW METHOD OF GREASE
TESTING

THE FINE HOLE LUBRICATING
GREASE WORKER AS A RAPID
SHEAR STABILITY TEST

MECHANICAL STABILITY TESTS
FOR LUBRICATING GREASES

SHEAR STABILITY OF GREASES

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Marketing Articles Accepted

With the growth of the NLGI *SPOKESMAN* certain marketing features concerning the lubricating grease industry will be accepted for publication in the Institute's technical journal, upon acceptance by the NLGI *SPOKESMAN* Marketing Advisory Committee. These articles will be in addition to the regular technical material. Those interested in contributing to the series should contact the national office.

NLGI Movie Start

Production of the NLGI-sponsored film on lubricating grease has begun and this 26-minute color movie with sound will become available to members and friends of the industry in 1957. Designed to serve as an instructional medium, the film will also serve as a public relations tool.

Learn the Correct Way

The famed NLGI booklet, *Recommended Practices for Lubricating Automotive Front Wheel Bearings* is now a part of the University of Texas Distributive Education program for service station personnel. Part of a fifteen-volume package for students, *Recommended Practices* is the latest addition to the curriculum. More than 90,000 copies of the manual have been distributed in this country and abroad.

A Warm Welcome

Three new member firms have been welcomed into NLGI in the past 30 days . . . Surpass Petrochemicals, Ltd. of Toronto, Canada and Petroleum Trading and Transport company of Tulsa are affiliated in an Active capacity, while Godfrey L. Cabot, Inc. of Boston has joined as An Associate member. All of these organizations will be recognized in special features in later issues of the NLGI *SPOKESMAN*.

NLGI membership is now at a record high, representing 98 per cent of the lubricating grease industry and a growing number of associate members.

Top Reservation Record

Reservations for the 24th Annual Meeting in Chicago were up 25 per cent over previous years, setting a new record.

The session, just concluded, had a number of interesting papers presented, which will be printed in the NLGI *SPOKESMAN*.

New Letterhead Design

Immediately after the election of officers and new NLGI Board members at the 24th Annual Meeting in Chicago last month, a new Institute letterhead design went into use. The new design was prepared by an outstanding authority and is at once distinctive, multi-purpose, and has strong retention.

A gradual introduction of this signature will be made on printed matter, including the stationery and the NLGI *SPOKESMAN*. Like many symbols and famous trade marks today, the Institute logotype is designed to get quick recognition and will earn remembrance . . . it is modern, yet dignified.

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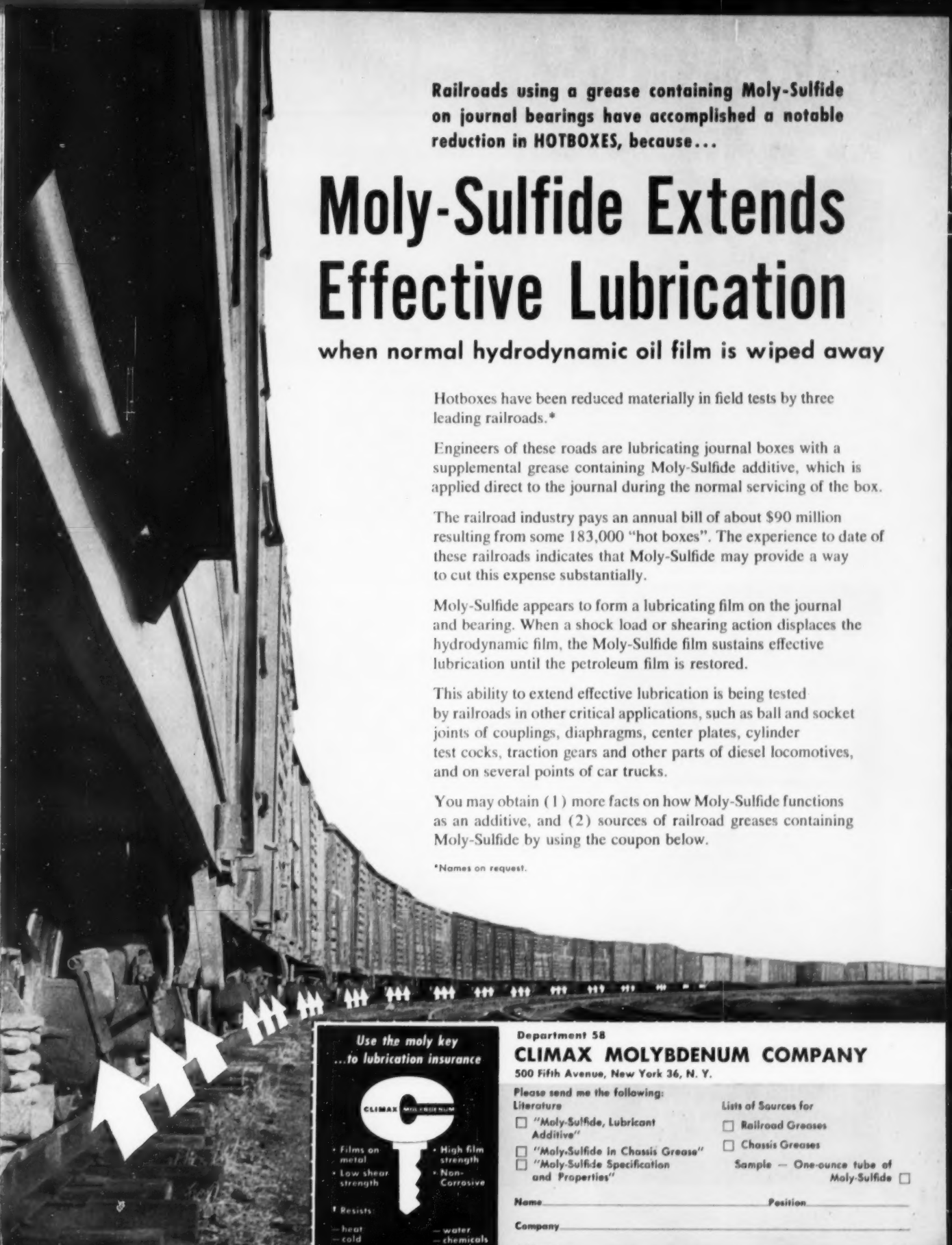
- **BONER'S BOOK** — *Manufacture and Application of Lubricating Greases*, by C. J. Boner. This giant, 982-page book with 23 chapters dealing with every phase of lubricating greases is a must for everyone who uses, manufactures or sells grease lubricants. A great deal of practical value. \$18.50, prepaid.
- **NLGI SPOKESMAN** — Bound Volume XIX, covering past issues from April, 1955 through March, 1956. An excellent reference source, sturdily bound in a handsome green cover. \$6.00 each, plus postage.
- **NLGI FILM** — *Grease, the Magic Film*, a 16-mm sound movie in color running about 25 minutes, to be released early in 1957. Institute sponsored at a cost of \$30,000, individual prints may be ordered now for \$800.
- **WHEEL BEARING MANUAL**—"Recommended Practices for Lubricating Automotive Front Wheel Bearings." More than 90,000 copies of this booklet have been distributed throughout the world. Just fifteen cents a copy with quantity discounts—company imprint can be arranged.

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PEOPLE in the Industry

EMERY INDUSTRIES, INC. ANNOUNCES RESEARCH AND SALES APPOINTMENTS



Sharkey
Sack
Macy
Wise

The appointment of Dr. H. Joseph Sharkey to the research staff of Emery Industries, Inc., Cincinnati, is announced by Dr. R. G. Kadesch, director of research. He will be associated with the organic research section under the direction of Dr. C. G. Goebel.

Dr. Sharkey recently received his Ph.D. from Oregon State college, where he was a research fellow. His

undergraduate work was done at Indiana university, and he obtained his M.S. from Butler university. Prior to receiving his doctorate he was an analytical chemist in the production and control division of Eli Lilly & Company.

Dr. Sharkey is a member of the American Chemical Society and Sigma Xi.

Sack to Southern Territory

The appointment of Joseph Z. Sack to the south central sales territory is announced by G. W. Boyd, manager of the fatty acid sales department of Emery Industries, Inc., Cincinnati. This territory includes the states of Missouri, Kansas, Colorado, Nebraska, Oklahoma, Arkansas, Texas, western Louisiana, southern Illinois, and western Tennessee.

Mr. Sack received his B.S. from the University of Kentucky in 1950. In his new position he will be responsible for the sale of Emery's complete line of fatty acids, including stearic acids, oleic acids, hydrogenated acids, and glycerides, animal and vegetable fatty acids, and castor oil derivatives.

Macy Assigned New England Area

The assignment of Tom W. Macy, Jr., as sales representative in the New England territory is announced by G. W. Boyd, sales manager of the fatty acid sales department of Emery Industries, Inc. Mr. Macy will be responsible for the sale of Emery's complete line of stearic, oleic, hydrogenated, animal, vegetable, and castor oil fatty acids in the Massachusetts, Rhode Island, Connecticut, Maine, New Hampshire, Vermont, and upper New York state area.

Mr. Macy is a graduate of Tufts College, Medford, Mass., where he majored in chemistry. He was previously associated with the General Electric Company's aircraft gas turbine division in Evandale, Ohio.

Wise Joins Research Staff

Dr. Louis M. Wise has recently joined the research staff of Emery Industries, Inc. According to R. G. Kadesch, director of research, Dr. Wise will be associated with the process research section under the direction of V. J. Muckerheide. He will be in charge of research on dry cleaning processes for Emery's sanitone division.

Dr. Wise is a native of Toronto, Canada and was previously with Hercules Powder company as project leader for textile finishes in their application research group. He holds a BA and MA from Queens university at Kingston, Ont., and a PhD from McGill university at Montreal.

He is a member of the American Chemical Society, the American Association of Textile Chemists and Colorists, and Sigma Xi.

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Fitzpatrick Heads Basic Research

The appointment of Dr. J. D. Fitzpatrick as manager of the newly created basic research section of Emery Industries, Inc., Cincinnati, O., was announced by R. G. Kadesch, director of research. Associated with Dr. Fitzpatrick in this group will be Dr. Kenneth N. Warner. The basic research section will be responsible for investigations of a fundamental nature relating generally to the line of products produced by Emery, including fatty acids, special acids, plasticizers, textile chemicals, esters for synthetic lubricants and a complete line of dry-cleaning compounds.

Dr. Fitzpatrick has been associated with Emery since 1933. He was manager of the new chemicals department from 1943 to 1952, when he was named to receive a company research fellowship at the University of Cincinnati. He recently received his Ph.D. from that university, where he also obtained his B.S. in Ch.E. and M.S. degrees. He is a member of the American Chemical Society and Sigma Xi.

Dr. Warner has been associated with Emery's organic research section for the past three years. He holds the degrees of Ph.D. from the University of Wisconsin and B.S. from Iowa State College and is a member of the American Chemical Society, Sigma Xi, Phi Mu Alpha, and Phi Lambda Upsilon.

Vulcan's McCarthy Appointed to Commerce Department

Vern I. McCarthy, Jr., vice president of Vulcan Containers Inc., of Bellwood, Ill., manufacturers of steel shipping containers and tin cans has been named to serve a six months appointment as deputy director of the containers and packaging division of the Business and Defense Services Administration, in the Department of Commerce, it was announced in Washington by BDSA Administrator Charles F. Honeywell.

In the post, McCarthy will represent the entire American packaging and container industry, including manufacturers of glass, wood, fiber, paperboard, textiles, as well as steel, plastic, aluminum foil, and tin plate containers. One of 25 industry-wide representatives of American business and industry serving with the Com-

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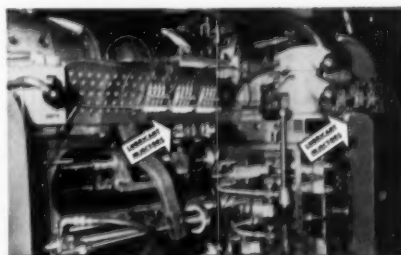
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merce Department on a "loan" basis, he will be responsible for reflecting the over-all activities of the container industry with the Federal government.

As Deputy Director he will participate in the development of long-range mobilization planning, industrial defense preparedness programs for the U. S. container and packaging industry in the event of national emergency, and will work in the rendering of broad information, statistical, and business service aids to the industry.

After his six months assignment, McCarthy will be available to the government as a trained industrial reservist.

In commenting on the appointment, Honeywell indicated that McCarthy would be giving additional valuable service to the Containers and Packaging Division by representing the viewpoint of smaller business in the government program.

An authority on steel shipping containers, which are used for a broad selection of packaging purposes including chemicals, food, and petroleum products, McCarthy at 29 is be-

lieved to be the youngest business executive ever to hold the post in the BDSA.

Educated at Missouri Valley College, Marshall, Mo., and Northwestern University, Chicago, McCarthy has been active in the research and product development activities of the Steel Pail and Tin Can Divisions of his company. He was instrumental in the development of a unique warehouse storage inventory system whereby Vulcan Containers maintains on hand the largest supply of steel containers in the nation in what is a veritable "department store" of steel shipping pails.

Has Conducted International Surveys

He has conducted surveys of European container manufacture on field trips to the Continent, and is intimately familiar with Canadian container production through Vulcan's subsidiary, Vulcan Containers, Ltd. of Toronto.

Active in industry-wide programs, McCarthy is a member of the Steel Shipping Container Institute, the Can Manufacturers Institute, and the Packaging Institute, and the National Institute of Packaging, Handling, and Logistic Engineers.

Native of Chicago

A native of Chicago, he is a Navy veteran of World War II. He literally grew up in the container industry. He is the third generation in his family to be engaged in the steel shipping container and tin can field.

McCarthy's grandfather, Patrick H. McCarthy, founded Vulcan in Chicago in 1916. His father, Vern McCarthy is president of the firm which is rated as one of the most progressive in its industry.

Shell Names Commercial Manager for Aviation Sales

Edwin D. Maxfield has been named to the newly created post of commercial division manager of the aviation department of Shell Oil company's head office in New York City. J. S. Harris, manager of the aviation department, made the announcement.

Mr. Maxfield will coordinate Shell's sales to airlines, aviation manufacturers and airports.

A mechanical engineering graduate of Lafayette College, Mr. Maxfield joined Shell in 1938 as a salesman. He was named to the aviation department

in 1945 after serving five years as an officer in the Air Force during World War II.

Prior to his recent appointment, Mr. Maxfield served as senior representative of the commercial division. He had also served as district manager in the New York division.

American Potash Appoints Barry

Jerry J. Barry has been appointed to the newly-created position of personnel and office manager at the Los Angeles plant of American Potash & Chemical Corporation, according to an announcement by Russell S. Sunderlin, Los Angeles plant manager.

Barry formerly was assistant to Robert B. Coons, vice president, Administration, at the company's main office, also located at Los Angeles.

In his new capacity, Barry will be in charge of wage and salary administration, personnel and labor relations, general office management and other duties. He will report to Forrest E. Branch, AP&CC director, administrative Services.

Swift Appoints Hoffman in Atlanta Area

Charles E. Hoffman, a native of Atlanta, will represent Swift & Company's industrial oil department in the Atlanta area it was announced recently.

Hoffman, who was educated at Georgia Tech, joined Swift & Company in 1950 and has represented the company at Atlanta and from Swift's general offices at Chicago.

Greenwell Is Midwest District Manager for Girdler

John E. Slaughter, Jr., vice-president in charge of the Girdler Company's votator division, has announced the appointment of Bartley A. Greenwell as midwest district manager with headquarters at the Board of Trade Building, 141 W. Jackson Blvd., Chicago.

The Girdler Company, Louisville, is a division of the National Cylinder Gas Company, Chicago.

Mr. Greenwell was born in Shelbyville, Ky., and received his B. S. degree in mechanical engineering at the University of Kentucky. During World War II he served as a pilot in the United States Air Force. Before be-



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coming associated with the Votator Division as a sales engineer in April, 1954, he was the president and general manager of his own company, Oxygen Service Co., Inc., of Kingsport, Tenn.

He is a member of the American Welding Society and the Benevolent and Protective Order of Elks.

The votator division of The Girdler Company is an engineering and manufacturing organization. It designs, engineers and installs complete plants for the processing of many food and industrial products. It also manufactures heat transfer equipment and auxiliary equipment for the continuous processing of a long list of liquid and viscous materials.

Archer and Nelson to Applied Radiation Board

Election of Shreve M. Archer, Jr., and Dr. George K. Nelson to the board of directors of the Applied Radiation corporation (ARCO), Walnut Creek, California, has been announced by Morris R. Jeppson, ARCO president.

ARCO produces linear electron accelerators, which promise to become one of the principal sources of radiation for commercial uses, and other electronic equipment.

The newly elected directors are both associated with Archer-Daniels-Midland which has acquired a 50% interest in ARCO. Archer is a member of the board of directors of ADM and Nelson is director of the company's development department.

Dawe Named Consultant for Seven Acheson Plants

Dr. Harold J. Dawe, for more than a decade in charge of research and development at Acheson Colloids company, Port Huron, Michigan, has been appointed technical staff consultant of Acheson Industries, Inc., it was announced by Howard A. Acheson, president.

Dr. Dawe's new responsibilities will include the supervision of technical activities at all seven Acheson Industries plants located in the United States, England and Holland. Dr. Dawe will maintain headquarters at Port Huron, Michigan.

Until his successor at Acheson Colloids is appointed, Dr. Dawe will continue to supervise research and development for Acheson Colloids

Continued on page 46

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ADM's

ADOL

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These characteristics make ADOL 32 ideal as an emollient, a super-fattening agent, and a compound for detergents. Other possible applications—chemical intermediates, surfactants, soaps, germicides, emulsifiers, resins, plasticizers, textiles, lubricating oil additives, cutting oil bases and sulfonates.

ADOL 32, as well as thirty new fatty alcohols (many never before available), is being produced at ADM's new Ashtabula, Ohio, plant. Warehouse stocks are being maintained for immediate shipment in drums or tank cars. Be sure to keep posted by writing for our latest Chemical Reactions Bulletin No. 907R and Specifications Bulletin No. 908A.

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2191 WEST 110TH STREET • CLEVELAND 2, OHIO

STRUTHERS WELLS CORPORATION, which is now one of the leading fabricators of process equipment of alloy and steel had its beginning as a small foundry, located on the banks of the Allegheny river at Warren, Pennsylvania. Its main products were castings used in farm machinery by the farmers of the community more than a century ago.

In the 1850's the plant was relocated along the tracks of the Pennsylvania railroad, which by that time had been constructed between Erie and Harrisburg, Pennsylvania. At the new location its products were expanded to include boilers and steam engines.

After the discovery of oil in the Pennsylvania area, Struthers Well became a producer of various equipment used in the oil fields. For many years its major product was gas fired engines, used to pump the oil wells throughout the area. These engines continued to be the major product of the corporation until about 1925 when more modern methods of pumping oil made the gas engine obsolete.

Struthers Wells then turned to the fabrication of process equipment, fabricating tanks and pressure vessels with the seams riveted and caulked.

From this beginning, Struthers Wells has pioneered in the development of the complicated equipment now used in the chemical, petroleum and food processing industries. The firm was one of the first to build welded pressure vessels. It pioneered in stainless steel fabrication. It built the first aluminum railroad car tank, and in recent years has mastered the art of welding such metals as titanium and zirconium.

In the late 1920's, the Struthers Wells plant at Warren was merged with the Titusville Iron Works and Titusville Forge Company in Titus-

ville, Pennsylvania, and the corporation was known as the Struthers Wells Titusville Corporation. Its name was subsequently changed to Struthers Wells Corporation. The Corporation in their two plants at Titusville, has facilities for large forgings, the fabrication of boilers, process equipment and large weldments.

NEW
MEMBER



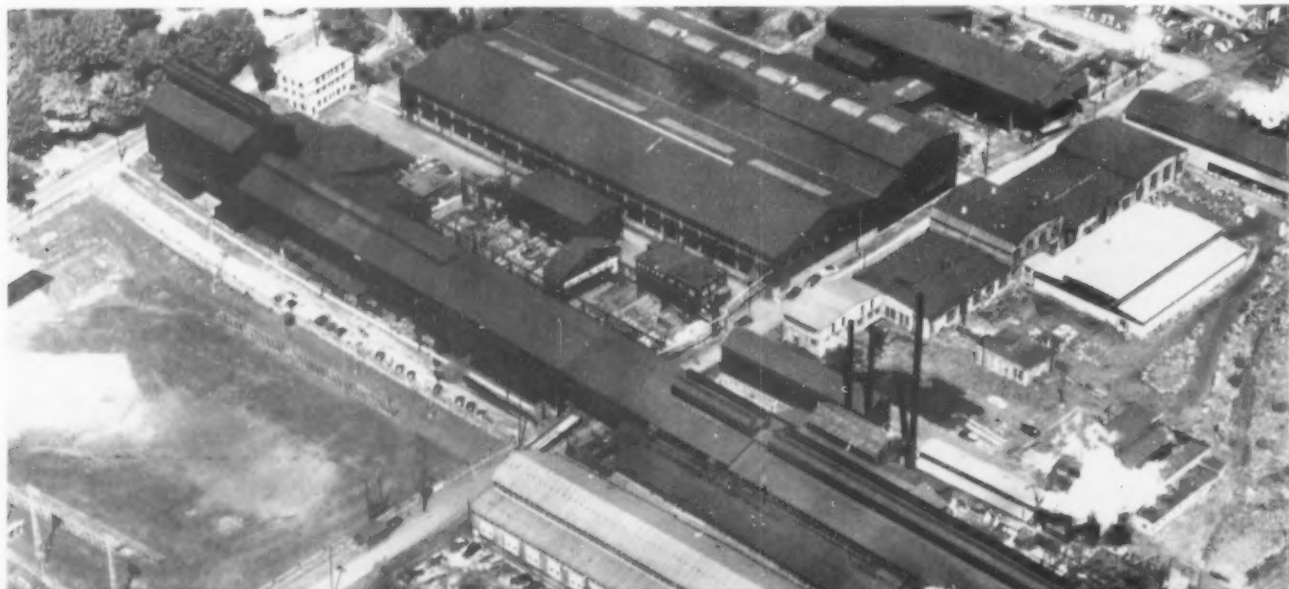
STRUTHERS

Joins NLGI

The name of Struthers Wells is well known in the petroleum industry as fabricators of refining equipment including towers, fractionating columns, grease mixers and heat exchangers. In recent years Struthers Wells has developed a line of direct fired heaters which has become very popular among petroleum refiners.

This organization has become aware of the growing need for new and better ways to manufacture grease both from the standpoint of speed and material specification. With this thought in mind, a program had been under way at the East Chicago laboratory of the Cities Service Research and Development Company to demonstrate the capability of recent improved mixing techniques developed by Struthers Wells engineers. The results of this recent study indicated that the production

Titusville Forge Division, Titusville, Pennsylvania



of all types of greases can be stepped up by the use of a combination of high speed and counter-rotating scraper types of mixers.

At the present time, production size equipment is being fabricated at the Struthers Wells plant in Warren which will duplicate the laboratory mixer now in operation at the Cities Service laboratory.

WELLS Corporation as an Associate Member

IVAN S. BRUMAGIM is director of corporation sales for Struthers Wells and serves as the technical committee member to NLGI. He was graduated from the Case Institute of Technology in 1927 with a B.S. in civil engineering.

Brumagim worked for two years as assistant supervisor maintenance of way on the Pennsylvania Railroad and then joined the H. M. Robertson company as ceramic engineer. He was chiefly concerned with the design and building of tunnel kilns.

In 1933 Brumagim accepted the position of manager of the mixing department with Struthers Wells Corporation and was promoted to consultant in 1946. He retained that position with the company until early 1956, when he became director of corporation sales.

NLGI Company Representative K. G. Timm



Timm

KARL G. TIMM, manager of the mixing department, has been commissioned by Struthers Wells to be its company representative to NLGI. Timm graduated from Warren High School, Warren, Pennsylvania, and then completed Pennsylvania State College extension courses in engineering, business English and Petroleum refining. He joined Delux Metal Furniture company where he was a designing engineer for five years. Then for a period of one year he was assistant technician to the U. S. National Forest Service.

Timm joined Struthers Well corporation in 1934 as a design engineer and remained in this capacity until 1946 when he was promoted to his present position in the mixing department.



Brumagim

NLGI Technical Representative I. S. Brumagim

Titusville Ironworks Division, Titusville, Pennsylvania



WOJTUL HEADS CONTINENTAL CAN'S FIBRE DRUM DIV.

Peter P. Wojtul, currently vice president in charge of sales for Continental Can Company, will assume the position of vice president of the company's fibre drum division, effective January 1, 1957. The new appointment was announced by General Lucius D. Clay, Continental's board chairman.

Mr. Wojtul, who will make his headquarters at the fibre drum division offices in Van Wert, Ohio, replaces Carl E. Eggers who is retiring on December 31st in line with the company's policy.

Wojtul Started With Continental Twenty-nine Years Ago

Mr. Wojtul started his career with Continental in 1927. He is a director of the Can Manufacturers Institute, Keep America Beautiful, Inc., and is a member of the Union League Club.

Mr. Eggers, present fibre drum division head, has served the company for over twenty-five years, making substantial contributions to the growth of the division and, in turn, to the parent company.

AMERICAN POTASH APPOINTS STERN

Dr. David Stern has been named assistant manager of the Whittier, California Research Laboratory of American Potash & Chemical Corporation, according to an announcement by Dr. William Emerson, manager of the laboratory.

Stern previously had been head of the research lab's electrochemicals section since he went with the company in April of 1955.

Prior to joining AP & CC, Stern was with Western Electrochemical Company which later became a part of American Potash & Chemical Corporation.

Du Pont Appoints Kay and Bridgwater

The appointment of two assistant general managers, Dr. William C. Kay for the organic chemicals department and Ernest R. Bridgwater for the newly created elastomer chemicals department, has been announced by the Du Pont Company. Both appointments are effective January 1.

Dr. Kay, director of manufacture of the organic chemicals department, succeeds Dr. George E. Holbrook who was named general manager of the new elastomer chemicals department. Mr. Bridgwater has headed up sales activities of the rubber chemicals division, later the elastomers division, since 1929.

Dr. Kay, a native of Melrose, Minn., was graduated from the University of Minnesota in 1930. Upon obtaining his doctor's degree in science from Massachusetts Institute of Technology, he joined Du Pont's Engineering Department in 1934 as an industrial engineer at the company's Chambers Works, Deepwater Point, N. J. In 1939, he was promoted to project engineer and between 1941 and 1943 he was chief supervisor of the production of neoprene.

During Du Pont's participation in the Manhattan Project in World War II, Dr. Kay was transferred in 1943

to the Clinton Laboratories at Oak Ridge, Tenn., as production superintendent. In 1944, he was moved to Richland, Wash., as a department superintendent and later technical superintendent at the Hanford Engineer Works, the plutonium plant which Du Pont designed, built, and operated for the government. In 1947 he was named process manager of the company's Grasselli chemicals department and in the latter part of 1950 was appointed director of manufacture, atomic energy division, in the explosives department. Following a brief period as technical director of the atomic energy division, he was named director of manufacture of the organic chemicals department in April, 1955.

Joined Du Pont in 1924

Mr. Bridgwater joined Du Pont as a rubber chemist in 1924 and in 1929 was made sales manager of the rubber chemicals division, later the elastomers division. Two years later he was appointed division manager. In 1949 following the consolidation of division manufacturing activities into a separate manufacturing division for the organic chemicals department, Mr. Bridgwater was named to his present position, director of sales for the elastomers division.

Mr. Bridgwater, born in Akron, O., studied at the University of Akron and was graduated from M. I. T. with a degree of bachelor of science in 1918. Following his discharge from the chemical warfare service at the end of World War I, he was employed as a rubber chemist by the B. F. Goodrich Company for three years and by the Firestone Tire and Rubber Company for two years prior to joining Du Pont in 1924.

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**LET US MODERNIZE
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THE C. W. NOFSINGER CO.

**Petroleum and
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KANSAS CITY 6, MO.**

*"In Engineering it's the
People that count"*

OIIC Elected New Officers At Chicago Meeting

M. S. Hauser, public relations director of the Ohio Oil company, Findlay, Ohio, has been elected 1957 National Chairman of the Oil Industry Information Committee—the petroleum industry's public relations program.

Hauser succeeds Richard Rollins, secretary of the Atlantic Refining company, Philadelphia, Pa. He will assume the chairmanship at the OIIC's next meeting in New York in December.

John S. Cooke, American Petroleum Institute, New York, was re-elected secretary.

**Surpass,
Alox
Appoints
Evans**



The appointment of Fred W. Evans as assistant to the president of Surpass Petrochemicals Limited, Scarborough, Ontario and Alox corporation of Niagara Falls, New York, was recently announced by James E. Shields, president of the aforementioned companies. Mr. Evans brings with him to his new post a valuable and diversified knowledge of the chemical industry obtained, in part, through his long association with Hooker Electro Chemical Co., in the capacity of supervisor of process development and research.

Mr Evans is a graduate of Cooper Union in chemical engineering and received his Master of Business Administration degree from the University of Buffalo. He is a member of the New York State Society of Professional Engineers, the American Institute of Chemical Engineers and Beta, Gamma Sigma honorary business fraternity.

His new duties will include the correlation of an intensified program of research and development at both companies as well as supervision of all phases of engineering, production, sales and general plant operations at Surpass.

NOVEMBER, 1956



Since "way back when," Monsanto has been helping lube manufacturers like you with the chemical problems of petroleum additives.

Modern Example:

IMPROVING GEAR LUBE PERFORMANCE TO MEET THE EXACTING MILITARY AND AUTOMOTIVE SPECIFICATIONS FOR HIGH-TORQUE, HIGH-SPEED OPERATION

What was needed was a true multi-purpose additive that would help heavy-duty gear lubricants stand up under the extreme pressures of high torque without sacrificing high-speed performance. Monsanto chemists developed Santopoid 22 and Santopoid 22 RI.

Gear lubes fortified with either... passed both high-speed and high-torque field trials in all automotive equipment tested on desert runs and mountain runs for 3 years... in 1954, 1955 and 1956.

Superior High-Torque Performance... for the past year Santopoid 22 has protected expensive heavy-duty worm-gear trucks used in grueling mountain hauling.

Excellent High-Speed Protection... before adding Santopoid 22, a racing car chewed up rear-end gears every 75-100 miles. Since changing to a Santopoid 22 fortified gear lube, 350 miles plus 100 warm-up miles have been clocked with gears still OK.

When you write specifications for your product, before investing in expensive tests... call in Monsanto. Monsanto can formulate your base stock—ready for field testing—with dozens of possible additives that will do just about any job an additive can do. Corrosion inhibitors • Detergents • Viscosity index improvers • Gear lubricant fortifiers Fuel oil clarifiers • "Oiliness" improvers.

For more information,
write to:

**Monsanto Chemical
Company**

**Organic Chemicals
Division**

**Department OA-2
St. Louis 1, Missouri**

MONSANTO

SANTOPOID, REG. U.S. PAT. OFF.

Industry NEWS

Shell and Standard Study 600-Mile Pipe Line Plan

Shell Oil Company and Standard Oil Company of California are actively studying plans to build a 600-mile pipe line to the Los Angeles area from the newly-discovered oil reserves in the Four Corners area, where the boundaries of Utah, Arizona, New Mexico, and Colorado intersect.

The announcement was made jointly in San Francisco by H. S. M. Burns, president of Shell, and T. S. Peterson, president of Standard.

They said such a line would follow generally uninhabited desert country on a route running southwesterly from Four Corners, north of Flagstaff, Arizona, just north of Kingman, Arizona, and through the Mojave Desert.

While engineering plans are still in the tentative stage, in conjunction with a survey of reserve potentials in this area, the two officials indicated consideration is being given to a 14-inch

line with an initial capacity of about 50,000 barrels daily and an ultimate capacity of approximately 100,000 barrels through addition of more pumping stations. The joint statement said:

"Indications are that a new oil province has been discovered in the Four Corners area with the probabilities that there are adequate reserves to support such a pipe line project. Since California's production is short of meeting demands, this new source would be vitally important in supplementing California's crude supply. This, of course, means that adequate markets are awaiting Four Corners' oil in the west."

Mr. Burns and Mr. Petersen said the project is being discussed with several other companies, with regard to their participation.

Construction would take from 20 to 24 months and would include a far-flung system of gathering lines in the Four Corners region."

New Book on Power Lubrication Systems

Up-to-the-minute details on the most recent developments in power lubrication systems are featured in a new catalog just published by Lincoln Engineering company, St. Louis. *Power Lubrication Systems* gives complete information on new, power-operated, centralized lubrication systems, including those recently adopted as optional factory-installed service accessories by leading manufacturers of automobiles, truck-trailers, and industrial machinery. The book covers description and functions of manual as well as both mechanical and electric automatic controls, together with photographs of the various types of installations, diagrammatic illustrations, and information on ordering. For your free copy of *Power Lubrication Systems* write to Lincoln Engineering company, 5702-30 Natural Bridge Avenue, St. Louis 20, Missouri, and ask for Lincoln Catalog 811.

FISKE BROTHERS REFINING CO.

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TOLEDO, OHIO

★

Manufacturers of

**LUBRICATING
GREASES**

CONTINENTAL CAN AND GAIR MERGER ANNOUNCED

Stockholders of both Continental Can Company, Inc. and Robert Gair Company, Inc. approved the merger of Gair into Continental at separate meetings held in New York October 26. The merger is expected to be effective as of that date.

Continental's vote at the Biltmore Hotel showed over 80% of its common and preferred shares approved the merger. An equally heavy vote was recorded earlier at the Gair meeting. The merger called for 8/10 of a share of Continental common for each share of Gair, with Gair preferred shares being exchanged equally for a new Continental second preferred stock.

General Lucius D. Clay, Continental's board chairman, announced the addition to Continental's board of four Gair directors: George E. Dyke, Raymond F. DeVoe, Robert L. Fitts and Parker Newhall. With the transfer of Arthur Chase from an active to an honorary director, Continental's board will now number 18 active directors.

Archer Daniels Midland Produces Alpha Olefin

Production of Alpha Olefin in commercial quantities was announced by Frank C. Haas, vice president, chemical products division, Archer-Daniels-Midland company, Minneapolis, Minnesota.

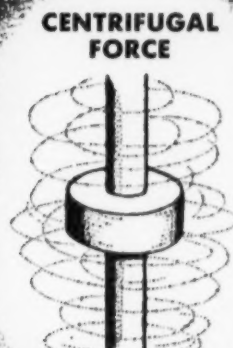
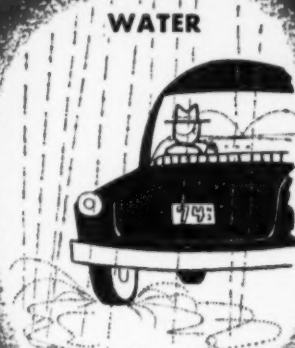
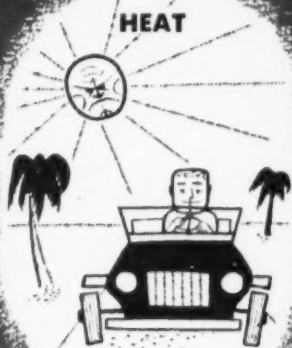
These products are newly developed, and because they are derived from fatty alcohols, will be processed in ADM's year-old fatty alcohol plant in Ashtabula, Ohio. The chain lengths are analogous to the chain lengths of

the alcohols from which they are derived. The Olefins are almost colorless, odorless liquids (at room temperatures). They are unusually reactive and contain excellent solubility characteristics. Suggested applications, among many still undeveloped, are chemical synthesis, resins, petroleum additives, textile agents, plastics, surfactants and polymers.

Specifications are available by writing ADM at 700 Investors Building, Minneapolis, Minnesota.

Continued on page 50

*Sure way to guard your greases
against these 3 enemies:*



Use a base of a
METASAP® ALUMINUM STEARATE

Metasap Stearates are known the world over as *the cleanest stearates made*.

Also, the Metasap technical staff is notably successful in supplying makers of greases with the exact properties they need for each specific task. There's a Metasap base which gives you a high gel type grease when *that's* what you need; another for a medium heavy gel where smoothness is your chief requisite; still another produces with great economy the semi-fluid, adhesive-type lubricant known as castor machine oil.

Each of these...and many more...and modifications of each to meet your most exacting needs, are at your service, together with the counsel of the most experienced stearate men in America.

Won't you call on them for their recommendations, soon?



METASAP CHEMICAL COMPANY

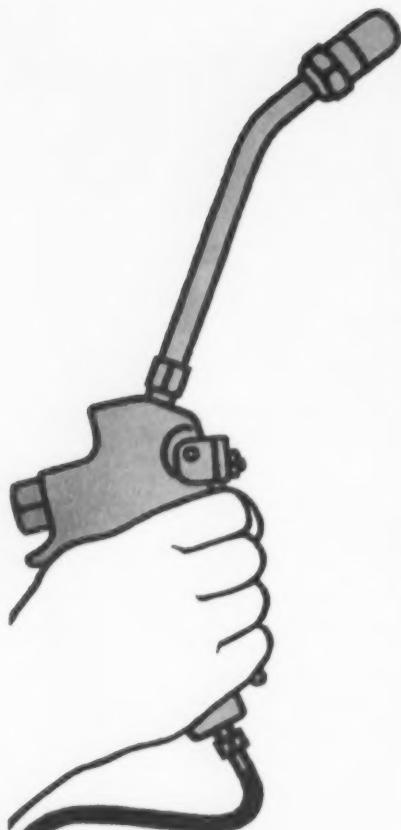
HARRISON, NEW JERSEY

Chicago, Ill. • Boston, Mass.

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the cleanest stearates made



laboratory
engineered
for your
protection

PENOLA AUTOMOTIVE LUBRICANTS

**GREASES,
CUTTING OILS**

are quality controlled
for dependable performance
in every lubricating job.



PENOLA OIL COMPANY
15 West 51st St., New York 19, N. Y.

Four Chemists Join Evans Research Staff

Further expansion of the technical staff of Evans Research and Development corporation has been announced by Dr. Eric J. Hewitt, vice-president of the New York City chemical consulting firm. Leonard J. Roth, from Brooklyn college; Anthony F. Lo Monte, from Long Island university; Edith T. Farrell, from Notre Dame college; and Barbara G. Chiffer, from Rutgers university, have joined the staff as junior research chemists.

In making the announcement, Dr. Hewitt pointed out that more and more industrial concerns in chemical and related fields are turning to independent consulting laboratories for technical assistance. This increased demand for services has resulted in a substantial expansion of the activities at Evans Research.

Manton-Gaulin Announces New Colloid Mill

A new two-stage colloid mill has just been announced by Manton-Gaulin Manufacturing Co., Inc., of Everett, Mass. It features a special RE (pat. applied for) design, incorporating removable rotor, stator and rotary shaft seal. This is said to simplify operating, speed changeover and cleaning and eliminate shaft leakage.

This Gaulin RE mill is fully described in Bulletin C-56, just released by the company. In addition to the exclusive Gaulin "RE" removable design, four other features are covered: Increased capacity with less horsepower, increased efficiency with less horsepower, selection of special materials for rotor and stator, including stainless steel, stellite, and chrome carbide; and complete interchangeability of rotor and stator for extreme processing versatility.

Mill is Water Jacketed

Construction details show that the RE colloid mill is water jacketed, has a rotor speed of 10,000 peripheral feet per minute and is designed so entire unit can be inspected, cleaned parts replaced and reassembled in minutes.

The Gaulin two-stage design also provides a micrometer gap setting which is adjustable while running. This combination is said to increase processing efficiency and make it readily adaptable for handling all types of raw materials or for changing

quickly from one product to another.

Bulletin C-56 also covers typical colloid mill applications for the emulsification and dispersions of chemicals, waxes, paints, food products and various concentrates. Specifications data is also provided on three sizes—two inch, four inch, and eight inch—for use in selecting the proper size and characteristics for specific processing applications.

Bulletin and additional technical data is available from: Manton-Gaulin Manufacturing Co., Inc., Industrial Division, 44 Garden St., Everett 49, Mass.

Mallinckrodt Now Producing Uranium for Commercial Electric Power

The world's first production by private industry of enriched uranium for use in generating commercial electrical power from atomic energy has recently started at the new Mallinckrodt Chemical Works' plant at Hematite, Missouri.

Current production at the Hematite plant features uranium dioxide enriched in the isotope U-235. This material is manufactured to meet individual customer specifications and is shipped to their plants where it is fabricated into shapes that will be most useful in the center or core of atomic reactors. When properly placed in position in the core, the uranium dioxide produces heat which leads to generation of electricity.

Two Grades of Uranium Produced

Two grades of uranium dioxide are being produced at Hematite. One is the ceramic grade which is designed for use in pellet form. The other is sintered or high-fired material which is for use in "matrix" or "ceramet" type fuel elements. Both grades can be manufactured to meet individual customer specifications for particle size and degree of enrichment in U-235. Other compounds, such as uranium trioxide, can be manufactured should the demand arise.

Processes Developed in St. Louis

Processes for the production of these materials were developed at a pilot plant in Mallinckrodt's main plant in St. Louis. Since the pilot plant was started in January 1956, several special uranium compounds have been prepared in sample quantities, in ad-

Continued on page 54

Youngsters Join Demo Fund Drive

A TASK-force joined the door-to-door search for dollars for the Demo campaign.

Legal, Medical Dinner Tomorrow

The San Francisco Bar Association's second reception will be held tomorrow.

Satellite Lead

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PAGE 10 SAN FRANCISCO CHRONICLE, Thursday, Oct. 18, 1956

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politicians.

Dan Poynter, 1870 of 3379 Clay street, is working on his second presidential campaign.

TASK groups do their part with tasks ranging from debating political issues to baby-sitting while the older folks go to meetings or cast their ballots.

Tuesday night, they joined voting Democrats in the city-wide drive for contributions from all registered Democrats in San Francisco.

The door-to-door march was part of a nationwide fund-gathering effort.

Everest Try

ZURICH — Zurich reports that a group of 11 climbers from Switzerland will attempt to gain the top of Mount Everest this summer.

Night Accidents

CHICAGO — Five out of five fatal traffic accidents occur at night, according to the Chicago Motor Club.

Car Maintenance Pay Offs Well

SALEM, Ore. (AP) — Oregon's State Department of Finance says it cut operating costs of State cars from 5.3 cents a mile to 4.5 cents in a year's trial of preventive maintenance.

This is what the 160 cars, put into the special pool, got: A grease job every 1000 miles; oil change and mechanical inspection every 2000 miles; complete mechanical inspection and survey every 10,000 miles.

Bob Johnson, Finance Department director, said that as a result the State not only saved \$25,000 in a year on maintenance and operation, but got an offer of 110 per cent of the wholesale "blue book" value on resale.

Floods, Drought

NEW DELHI—Drought has followed floods in India.

We
Offer
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Short but powerful . . . this Associated Press article reprinted from the San Francisco CHRONICLE last month points up what NLI'ers have been saying for years. Preventative maintenance cuts costs on operating vehicles, and the State of Oregon's automobiles got a lubricating grease job every 1,000 miles, to save the state money and provide safe transportation for the fleet of drivers.

REPORT FROM SWITZERLAND

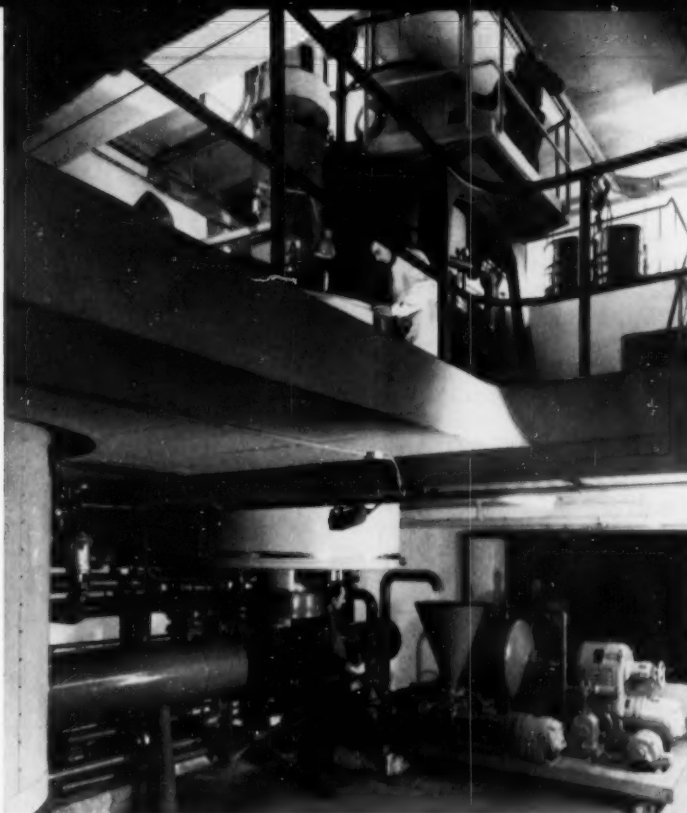
FROM THE ANCIENT town of Berne comes news of further expansion of the Swiss firm Adolf Schmids Erben, Inc. These photographs are views of their new grease plant which was designed and built by a Swiss company. The plant will operate especially to meet the needs of the Swiss lubricant market.

Hermann P. W. Wanner, the managing director of Adolf Schmids Erben, takes great pride in the cleanliness and neat appearance of the plant, which incorporates the newest developments of grease making.

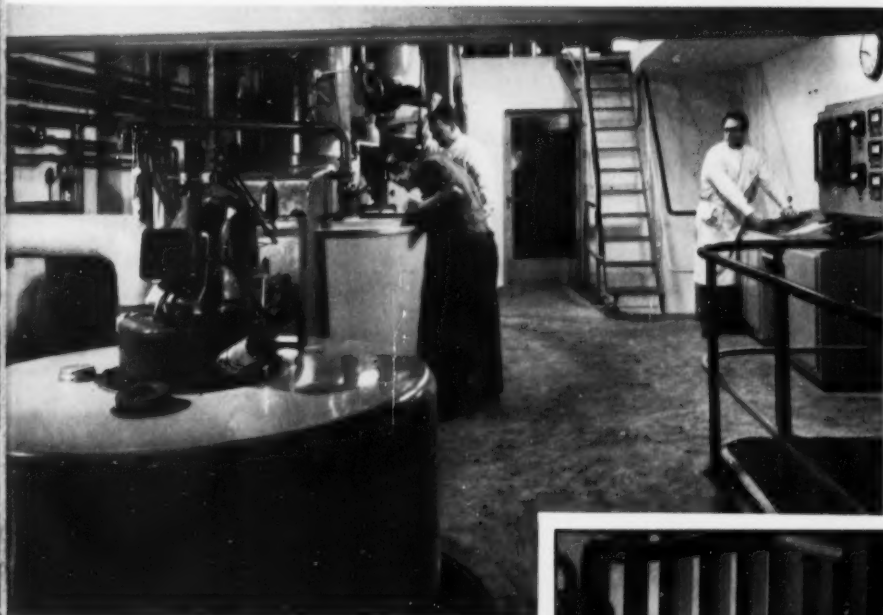
This company was the first European member to join NLGI. It was founded in 1884 by Adolf Schmid, in Berne, which had been his ancestral home for centuries. He supplied the agricultural districts of the Canton of Berne with all types of lubricants. The company was incorporated in 1925 and is now specializing in the manufacture and sale of all industrial lubricants. Adolf Schmids Erben, Inc. is the exclusive distributor in Switzerland for the Pennzoil Company, Inc. Oil City, Pennsylvania, for the silicone oils and greases of the Dow Corning Corporation, Midland, Michigan, and for the Acheson Colloids Limited, London, England. The company operates under the trade name of ASEOL.



**NLGI'er Has Modern
Lubricating Grease
Plant in Ancient Swiss City**



THE new grease plant is made especially for the Swiss lubricants market. Two other mixers, not visible, can be served from the autoclave.



LEFT—this view of the plant shows the control instrument.

BELOW—this picture was taken in the corner of another building reserved for the compounding of oils; it shows the installation for distributing incoming steam for heating.

LEFT—interior of the modern, well lighted laboratory.



Mallinckrodt Produces Uranium

Continued from page 50

dition to the more popular items listed above.

These compounds were manufactured from uranium hexafluoride purchased from the Atomic Energy Commission at Oak Ridge, Tennessee. The pilot plant production was controlled to simulate processes involving enriched materials, although the uranium hexafluoride used contained only the normal amount of U-235.

The plant, which was designed by the Mallinckrodt engineering department, is completely air-conditioned and fireproof. Much of the highly specialized process equipment was especially fabricated to meet the requirements of techniques developed in the pilot plant.

The manufacturing area is enclosed by a wire fence and security guards are on twenty-four-hour duty. In this area are separate raw material and finished product warehouses and a 12,800-square-foot main building, approximately two-thirds of which is processing area. The remainder of the main building provides space for of-

fice, laboratory, locker and shower room, lunchroom and utility room.

Mallinckrodt engineers have developed a number of elaborate precautions that permit safe control of radiation, dust and materials. For example, all exhaust air is put through special dust collectors to insure complete removal of uranium dust, not only for product recovery, but also to make certain that surrounding air will not be contaminated. All process water is thoroughly treated prior to discharge into the neighboring stream to remove all objectionable chemicals, and a special sanitary sewage treatment plant has been installed to prevent stream pollution.

High-Temperature Lubrication Described in New Acheson Bulletin

A compilation of current good practice in high-temperature lubrication with colloidal dispersions is contained in a new brochure, Bulletin No. 423, which has just been published by Acheson Colloids Company, Port Huron, Michigan.

The new bulletin contains many brief case histories which describe how 'dag' Colloidal Graphite, a high-purity electric-furnace graphite processed to colloidal size and dispersed in a wide variety of fluid carriers, is effectively used for general high-temperature lubrication of oven conveyor chains, kiln car wheel bearings and virtually any other type of mechanical equipment. Also discussed are applications for 'dag' dispersions of Molybdenum Disulfide.

Better Finish at Less Cost

Methods for increasing die life and obtaining better finish at less cost in such operations as forging, extrusion, stamping, wire-drawing, deep-drawing and stretch-forming, are presented in the new bulletin. Recommended procedures for using 'dag' dispersions in die-casting and permanent-mold casting are also given. In addition, many applications for 'dag' dispersions in glass-making machinery and on glass molds to help eliminate sagging, sticking and "washboard surfaces," are included. Numerous product design applications involving pre-assembly coating and utilization of the heat-resistant properties of Acheson colloidal dispersions are also cited in the bulletin.

Copies of Bulletin No. 423 "dag" Colloidal Dispersions for High-Temperature Lubrication" may be obtained from Acheson Colloids Company, Division of Acheson Industries, Inc., Port Huron, Michigan.

Lincoln Centralizes Grease Fittings in Manifold Block

Even the smallest machine units can be completely lubricated, in seconds, with a new low-cost centralized lubrication system, recently announced by Lincoln Engineering company of St. Louis.

The system consists of one or more manifold blocks, threaded for insertion of standard hydraulic grease fittings. Blocks are bolted to the most easily accessible location on the machine. Rigid or flexible feed lines connect bearings to inlet ports of the manifold blocks. Fittings can be contacted by any standard manually or power-operated application device, such as lever guns, bucket pumps or power lubricators.

According to the manufacturer, this system reduces lubrication man-hours, eliminates "overlooking" one or more points of contact, prevents accidents, and permits lubrication without machine shutdown. The simplicity of the system makes installation a quick and easy job with no special tools to buy.

For additional information and a list of all components necessary, write for Bulletin 681-A, Lincoln Engineering company, 5702-30 Natural Bridge Avenue, St. Louis 20, Missouri.

J. F. Drake Receives A.P.I. Gold Medal

J. Frank Drake, former president and retired chairman of the board of Gulf Oil Corp., Pittsburgh, Pa., was named today as the 1956 recipient of the American Petroleum Institute's Gold Medal for Distinguished Achievement.

The Gold Medal, which is regarded as one of the nation's top industrial citations, will be given to Drake in person next month at the Institute's 36th annual meeting in Chicago.

Formal presentation will be made Wednesday, Nov. 14, before an audience of several thousand oil men and their guests. Jake L. Hamon, chairman of the API Board of Directors, will

HARSHAW LEAD BASE

Harshaw Lead Base, as an additive to petroleum lubricants, improves extreme pressure characteristics and imparts the following desirable properties:

- Increased film strength
- Increased lubricity
- Improved wetting of metal surfaces
- A strong bond between lubricant and metal surfaces
- Resistance to welding of metals at high temperatures
- Moisture resistance and inhibits corrosion

Harshaw Lead Bases are offered in three concentrations to suit your particular needs:

Liquid	Liquid	Solid
30% Pb	33% Pb	36% Pb

Other metallic soaps made to your specifications. Our Technical Staffs are available to help you adapt these products to your specific needs.

THE HARSHAW CHEMICAL CO.

1945 E. 97th Street • Cleveland 6, Ohio
Branches in Principal Cities

make the presentation on behalf of the Institute and the industry.

In keeping with the traditions of the API Gold Medal, the specific reasons for honoring Drake will not be divulged until the ceremony takes place. At that time, an illuminated scroll will be read to the audience and presented to Drake as a corollary of the Gold Medal. In general, however, the API award is presented to some outstanding American, not necessarily an oil man, who has made substantial contributions to the arts and sciences of petroleum, or to humanity through the petroleum industry.

In receiving the API Gold Medal, Drake thus joins the ranks of such distinguished men of industry and science as Wallace E. Pratt, internationally-famous geologist and author, and former vice president of Standard Oil Company (New Jersey); Otto D. Donnell, former president of the Ohio Oil Co.; Lieut. Gen. Ernest O. Thompson, veteran conservationist and former chairman and long-time member of the Texas Railroad Commission; Walter C. Teagle, former president of

Standard Oil Company (New Jersey); J. Howard Pew, former president of Sun Oil Co.; Dr. Charles F. Kettering, internationally-known scientist and inventor; and the late Henry Ford, the motor magnate.

The API Gold Medal was established in 1946, and awards have been made annually, except for the years of 1952 and 1955.

Drake retired in April, 1955, as chairman of Gulf's Executive Committee, after having served five years as chairman of the board of directors, and 17 years as president. He is still a member of the Gulf board, however, and of its Finance Committee.

Drake first joined Gulf in 1919, as assistant to the president. In 1923, he left Gulf to become president of the Standard Steel Car Co., another Mellon company. When Standard Steel and its subsidiaries were merged with the Pullman Companies in 1930, Drake was elected chairman of the Board of Pullman, Inc. In 1931, he resigned to return to Gulf as president.

Drake was elected chairman of the board of Gulf in May, 1948, and five years later was named chairman of the Executive Committee.

A native New Englander, he is a graduate of Dartmouth College, from which institution he received an honorary degree of Doctor of Laws in 1952. During his long career in petroleum, Drake has been a member of the board of the American Petroleum Institute, and has served with the Petroleum Industry War Council, and the National Petroleum Council, as well as the National Industrial Conference Board, of which he was chairman from 1945 to 1947.

Valvoline Expansion Requires New Packaging Line

The Pacific division Los Angeles terminal of the Valvoline Oil Co., Freedom, Pa. have completed installation on a new canning and packaging line. Expanded sales and demands for Valvoline Motor Oil in the Los Angeles area necessitated this production facility increase.

This completely automatic canning and packaging machine doubles the capacity of the Los Angeles terminal. In addition to this new packaging equipment, one new local delivery

truck has been added at Los Angeles to maintain the traditional Valvoline service to dealers.

In addition to the new can packaging equipment, modern high-speed automatic drum filling equipment has been added to facilitate the handling and servicing of Valvoline bulk sale accounts. According to Mr. Amos Corgiat, Pacific division manager, "The new equipment is already working to capacity and Corgiat believes growing gallonage requirements of Valvoline dealers will soon necessitate another modern packaging line."

Valvoline has been distributed in the 11 western states since approximately 1875.

Selected ASTM Engineering Materials Standards

A compilation has been prepared for use by college engineering students and teaching staffs. By supplying representative illustrations of nationally accepted standard specifications and the standard test methods which support them, the student can be made familiar with the existence, availability,

Continued on page 58



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N. J. Gothard, Chief Chemist

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Selected ASTM Standards

Continued from page 55

nature, and origin of the specifications for the materials which all engineers must use. Specific standards were selected on the basis of a poll among engineering educators. They are intended to include not only the standards most closely linked to the work of the course but also standards that illustrate the varied nature and approach to problems of standardization.

Introductory and supplementary material to provide background and breadth of grasp has been included. The condensation of the 1907 ASTM presidential inaugural address by Charles B. Dudley points up the need for standards and illustrates the variety both of the tangible and psychological problems that relate to their use. The modern engineer should also have some appreciation of the legal aspects of standardization and that, too, is given limited attention.

Although the compilation is intended to be closely correlated with the formal course work in materials and materials testing, it is not in any sense a textbook; it is a supplement rather than a replacement.

Climax Exhibits Scale Model Of Molybdenum Mine

A scale model of a cross section of North America's largest underground mine features at the mining, metallurgy and metalworking exhibit held in the Department of Commerce Building, Washington, D. C., from October 15 through November 9, 1956.

The model depicts a cut-away of the molybdenum mine operated at Climax, Colorado, by Climax Molybdenum Company. It shows how, through the licensing of technology under the United States patent system, mining facilities and techniques have become so efficient that an entire mountain is being broken down and drawn off to permit recovery of molybdenum amounting to less than half of one percent of the bulk ore.

AP & CC Opens Plant Section

A plant engineering section has been established at the Los Angeles plant of American Potash & Chemical corporation to provide technical services as part of the company's expansion and development program.

Fred Torn has been named head of the new section, according to the announcement by Russell S. Sunderlin, manager of the Los Angeles plant.

The new department will be responsible for design of new plant equipment and facilities. It also will work on improving existing processes and will make economic studies in connection with plant production.

Bowers Move to Florida

H. P. Ferguson of Standard Oil Company (Ohio) and a director of NLGI sends word that former director Milton R. Bower and his wife have moved to St. Petersburg, Florida.

Bower retired from Standard Oil last year after twenty-nine years as the manager of the lubricating oil sales. He was a pioneer of NLGI and served as its president in 1939.

The Bowers would like their friends in NLGI who plan a winter vacation on the west coast of Florida to know that the Bower address is

200 Twenty-Fifth Avenue, S.
St. Petersburg 5, Florida

NLGI sends warm wishes to the Bowers.

Du Pont Creates Elastomer Chemicals Dept.

The Du Pont company has announced the creation of a new department, elastomer chemicals, to be responsible for research, production and sales for all products currently handled by the elastomers division of the company's organic chemicals department.

The new organization, bringing the total of the company's operating departments to 11, will have as its general manager Dr. George E. Holbrook, assistant general manager of the organic chemicals department. Samuel G. Baker, recently appointed general manager of the organic chemicals department, will continue as head of that department.

The step, which becomes effective January 1, was taken because the expanding business and product lines of the elastomers division now justifies the organization of a separate department.

In addition to neoprene and rubber chemicals, the new department will manufacture and market "Hypalon" synthetic rubber and "Hylene" organic isocyanates.

NLGI SPOKESMAN

FUTURE MEETINGS of the Industry

NOVEMBER, 1956

- 1-2 SAE National Diesel Engine Meeting, Drake Hotel, Chicago.
- 8-9 SAE National Fuels and Lubricants Meeting, The Mayo, Tulsa, Okla.
- 8-10 National Oil Jobbers Council (annual meeting), Palmer House, Chicago.
- 12 API OHC Steering Committee, Conrad Hilton Hotel, Chicago.
- 12-15 American Petroleum Institute (36th annual meeting), Conrad Hilton & Palmer House, Chicago, Ill.
- 25-27 Kansas Independent Oil & Gas Association (19th annual meeting), Broadview Hotel, Wichita.
- 26-30 National Exposition of Power and Mechanical Engineering (ASME), New Coliseum, New York, N. Y.
- 27-30 American Chemical Society (9th National Chemical Exposition), Cleveland, Ohio.

DECEMBER, 1956

- 3-4 New Mexico Oil & Gas Association (annual meeting), Alvarado Hotel, Albuquerque
- 4-5 Petroleum Packaging Committee, Hotel De Soto, Savannah, Georgia.
- 5-6 The Asphalt Institute (annual meeting), Site still unselected.
- 6-7 API Oil Industry Information Committee, Biltmore Hotel, New York City.
- 16-18 Kansas Independent Oil & Gas Association (annual meeting), Broadview Hotel, Wichita.

JANUARY, 1957

- 8-10 Kentucky Petroleum Marketers Association (annual meeting), Brown Hotel, Louisville.
- 23-24 Northwest Petroleum Association, Nicollet Hotel, Minneapolis.

FEBRUARY, 1957

- 26-27 API Division of Marketing (lubrication committee), Sheraton-Cadillac Hotel, Detroit.

MARCH, 1957

- 11-12 Illinois Petroleum Marketers Association (35th annual convention), Hotel Pere Marquette, Peoria, Ill.
- 14-16 Texas Oil Jobbers Association (annual convention), Rice Hotel, Houston.
- 20-22 API Division of Production (Southern District meeting), Washington Youree & Captain Shreve Hotels, Shreveport.

APRIL, 1957

- 10-12 API Division of Production (Mid-Continent District meeting), Mayo Hotel, Tulsa.
- 16-18 National Petroleum Association, Cleveland, Ohio.
- 24-26 API Division of Production (Rocky Mountain District meeting), Gladstone, Townsend & Henning Hotels, Casper, Wyo.
- 28-30 Independent Petroleum Association of America (midyear meeting), Buena Vista Hotel, Biloxi.

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NLGI's monthly technical journal, the NLGI SPOKESMAN, has earned another award as an outstanding publication . . . the sixth in ten years. Last month an "Award of Merit" (second place) was given to the Institute staff by the Society of Associated Industrial Editors, ". . . in recognition of exceptional accomplishment of purpose, excellence of editorial content, and effectiveness of design." Special attention was given to the fact that almost one fifth of the SPOKESMAN circulation is sent overseas and that it is on file in many libraries and technical organizations.

**A
W
A
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D**

General Awards



Award of Merit
1956

PUBLICATION FIRM National Lubricating Grease Institute

EDITOR T. W. Miller

STAFF Joan Searthout



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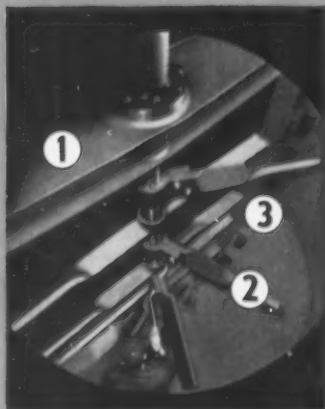
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big interest...
tion has performed that function
well... The Republican Party is
not a fit instrument to govern a
Nation that wants to make prog-
ress for the benefit of the ordinary
people."

VISITS SIX COUNTIES

Stevenson earlier had a word
about Mr. Eisenhower's personal
role in governing the Nation. At

settles for three days. Near the
heads west to Washington and
California.

The Democratic nominee told
his Jersey City audience that Pres-
ident Eisenhower must personally
take the blame for "the shortcom-
ings in the public housing pro-
gram."

He said Mr. Eisenhower's reac-

Stevenson said.

Specifically he accused the Re-
publicans of using their "libera-
tion" policy vis-a-vis European
satellite countries for political pur-
poses.

At the eight cities the Demo-
cratic Presidential nominee visited,
he welcomed the local and Con-

Hall, where he
go first upon th
at the Academy

A caravan of 50
assemble at Rey
this afternoon to
committee memb
to advertise the
enhower Band
panied by a mu-
wagons, bands, a
zens-for-Eisenho
Special" will m
central city at nu
rade ending at
headquarters of
enhower, where
will hold a lunch

A BRIEF REST

The caravan
President will g
ence Hall to th
traveling on Ma
17th st. and so
hotel. The Nixon
and a brief rest
at the Academy

Under the aj
isens for Eisen
alcade will am
Plaza tonight to
wick and greet
as he leaves th
to the Academi
were being mad
a delegation of
ashes blasoner
Pat and Mami
hotel entrance
parts, to prese
a bouquet.

While the es
leaving the h
18th and Ch
Academy, the
his immediate
on 17th st. I
Spruce st. to
st. to Chestnut
Chestnut and
Academy.

The doors
open tonight
admission will
restricted to
its may be ob
Central Ca
headquarters
Trust Building
leaders and c

MUSICAL P

A musical
Fuhrman's c
the rally wh
8:30 P. M. by
acting chair
can Central
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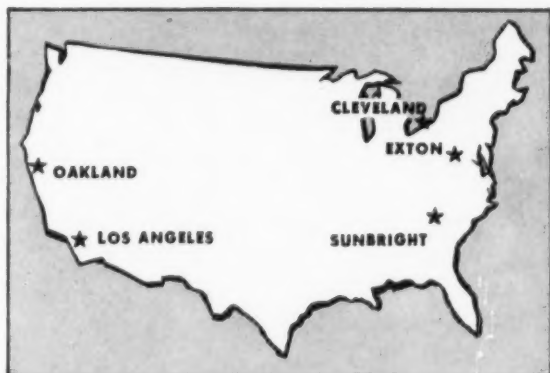
Foote Lithium Hydroxide Now Available from Five Key Distribution Centers

To provide even better service for grease manufacturers, Foote Mineral Company is now operating five key distribution centers for lithium hydroxide monohydrate, used in the production of multipurpose greases.

Located at Oakland and Los Angeles, Calif.; Cleveland, Ohio; Sunbriht, Va.; and

Exton, Pa.; these centers will maintain ample stocks of Foote lithium hydroxide to assure the most rapid and advantageous deliveries to all grease manufacturers.

A company spokesman stated that 30 major grease manufacturers are producing lithium base greases that provide positive lubrication at temperatures ranging from -60°F. to over 300°F. even in the presence of water. Other producers are invited to inquire about the distinct manufacturing, marketing and lubricating advantages of these superior lithium multi-purpose greases.



Map shows the location of the five distribution centers established by Foote to provide localized supply of lithium hydroxide used as the base in the manufacture of multipurpose greases.

err needs to show.

All the rest of it is in the mind of the lucky ones who see the picture, which is just another way of saying that originally the thought and the whole idea were in the mind of the photographer. Accidents can and do happen, but if your picture expresses something worthwhile and makes the observer think as he sees it, the chances are many millions to one that the photographer had an idea and then used his indispensable tech-

THE FALL COLOR MOVIE

Along about this time of year everybody who has a movie camera—and who has not?—goes out to make a movie of the wonderful artistry with which Jack Frost has painted the leaves.

Most unhappily, too many of those movies might better have been made with a still camera. Because of the techniques used, or perhaps the lack of them, the pictures made with the movie camera

even better if father or some other member of the family knows enough about the trees to distinguish their differences in closeups that might show leaves or bark or anything else that seems to him, as a naturalist, to be important.

POINT OUT TREES

If the approach is to be entirely scenic, remember that scenes need life in them if there are going to be very many of them. Let somebody walk into the scene to show



FOOTE MINERAL COMPANY

402 Eighteen W. Chelton Building, Philadelphia 44, Pa.

RESEARCH LABORATORIES: Berwyn, Pa.

PLANTS: Exton, Pa.; Kings Mountain, N.C.; Sunbriht, Va.; Knoxville, Tenn.

Stevenson smiled and said "Breaking of Ike, I'd trust him

ON SCHOOL NEEDS

When it came to schools, Ste-

Ex-Dancer Dies in Leap

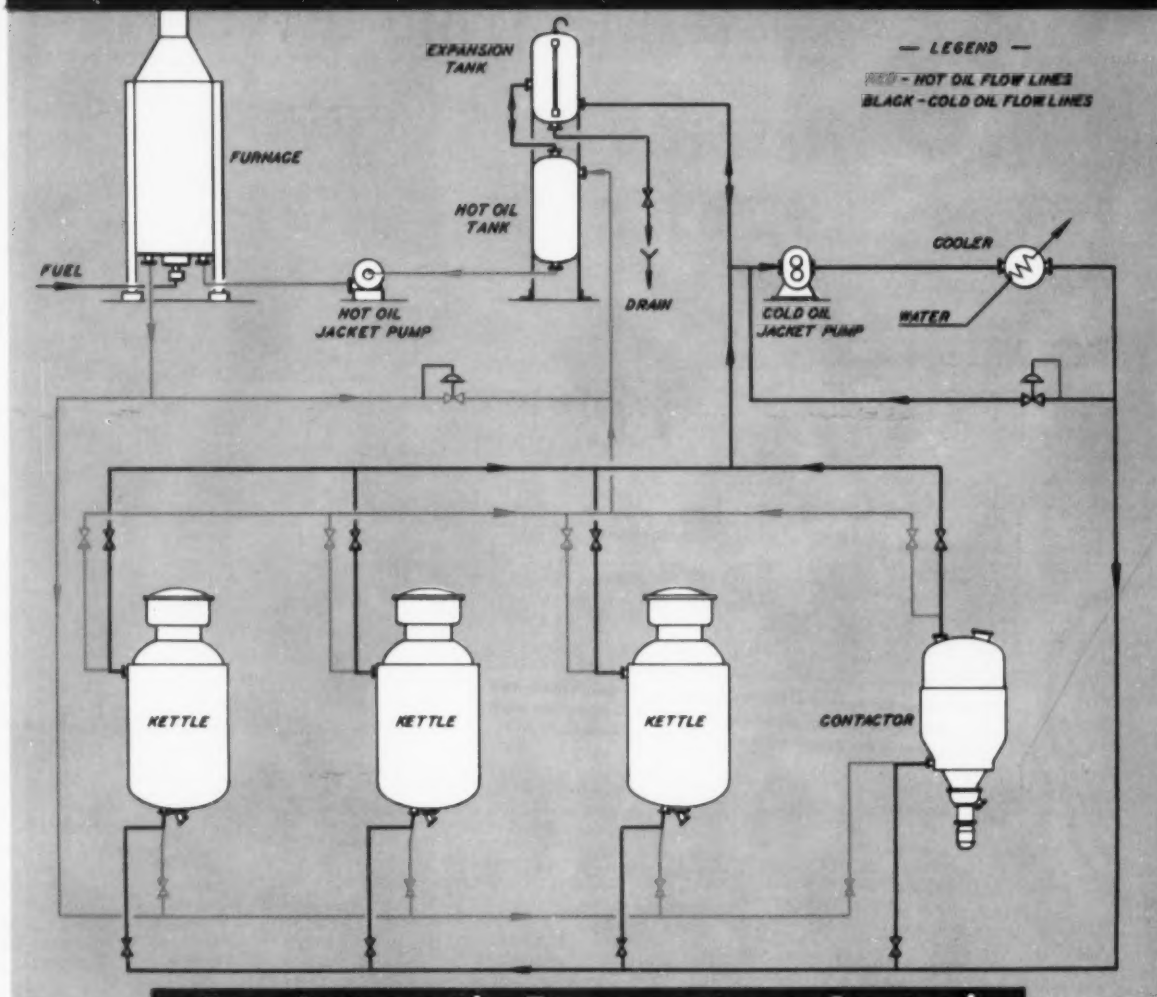
SAN FRANCISCO, Oct. 2 (AP).—A former dancer, apparently

New

STRATCO

Reg. U. S. Pat. Off.

COMBINATION HEATING-COOLING SYSTEM*



For Automatic Temperature Control

A completely automatic combination heating and cooling system using the same heat transfer medium.

Provides fully automatic control through all operating temperatures up

to 600 degrees F., for grease making and other processes.

Instrumented to require no attendant.

Study the flow chart above. Write for detailed information.

* Patents Pending

STRATFORD ENGINEERING
Corporation

612 West 47th St.

PETROLEUM REFINING ENGINEERS

Kansas City 12, Mo.